Perspective Practical.

Or, A Plain and Easie

METHOD

Of true and lively Representing all Things
to the Eye at a distance, by the Exact

RULES OF ART

AS,

Landskips, Towns, Streets, Palaces, Churches,
Castles, Fortifications, Houses, Gardens and Walks, with their Parts
as Walls, Doors, Windows, Stairs, Chimneys, Chambers and
Shops, with their Ornaments and Furniture, as Beds, Tables, Chests
Cupboards, Couches, Chairs, Stools, and other Moveables, Regular
or Irregular, in several Postures.

LIKEWISE

RULES for Placing all sorts of Figures, with their several Postures, Scituation and
Horizon; Also, A TREATISE of Shadows natural by the
Sun, Torch, Candle, and Lamp, very useful and necessary

FOR ALL

PAINTERS

Engravers, } { *Carvers*
Architects, } { *Goldsmiths,*
Embroiderers } { *Tapestry workers.*

And all others that work by design, by a Religious Person of the Society of JESUS
a Parisien.

Faithfully Translated out of French, and Illustrated with 150 Copper Cuts.

Set forth in English by *Robert Pricke* for the Lovers of Art.

THE

PREFACE.

THE Art of Perspective, which hath the eye for its Principle, to whom Nature hath given more vivacity and more Perfections then to the other senses, and which holdeth amongst them the Rank, and the Advantages that the Soul hath above the Body, is likewise the fairest and most delightful of all the Parts, that the Science of the Mathematicks hath put forth into light. This Science may well boast it self to be the soul and the life of Painting, seeing that it is it which giveth unto Painters the Perfection of their Art, which in its ordering the heights and the measures of the Figures, the Moveables, the Architectures, and other Ornaments of a Picture: It instructeth what colours he should use, lively or sad, in what place he ought to apply the one and the other, what he ought to finish, and what ought not so to be: where one is to give a light, and where there is no need of it: in a word, it is this that ought to begin and finish, seeing that it ought to go throughout all. Without help, the best Master will make as many faults as draughts, principally in Architectures, wherewith they would enrich their Works, as I have seen in Pieces well esteemed, where they have failed so foully, that this in part hath been the motive of my design, for to cause them to know their errours without naming them, and to teach the young ones to avoid them. How excellent a Painter soever one is, he must observe all these Rules, or he shall content none but Ignorants, and a Reasonable Painter that shall know and use these well, shall do wonders to every ones content.

a   The

The Engraver in Copper ought not to be more ignorant of it then the Painter, feeing that he doth that with his Graver, which the other doth with his Pencil: It will make him to know that which he ought to touch roughly, and that which he ought to make faint. The need that he hath of this Science is fo much the more neceffary, as his Pieces are far more in number, then thofe of the Painter: the which if they be skilfully made, his praife is encreafed: if on the contrary, his defects are thereby the more known, and every Piece is a Mouth which decrieth its Workman.

The Carver in Bofs fhall learn the height which he muft give to his Statues, as well for below as for the midft, and in proportion to that which is higher, what Projector he muft give to Buildings, and to other Bodies that have Mouldings or demi-Bofs, the Angle for the point of the fight, for to take the heights and abridgements of all the Objects near and far off.

The Architect by this Science, may be able to give the underftanding of his defignes in a fmall fpace, he may alfo elevate one part, and leave the other in Plane, for to make his whole work appear; and feeing that we are upon Architecture, there needeth that the Perfpective, (or he that profeffeth this,) be learned therein, at leaft in the Practice of the Hand, by reafon that the faireft Pieces of Perfpective are made in rich and fumptuous Buildings, framed according to the Orders of Columns, the Beauty of which dependeth on Proportions and Meafures, which ought to be obferved therein, otherwife they will offend the eye; wherefore they ought to be well ftudied, and whofoever knoweth them not when he ought to know them, is worthy of blame, feeing the eafinefs that he hath to learn them, having *Vitruvius*, *Vignola*, *Scamozzii*, and many other which have written thereof fo pertinently.

It is not enough that he knows the Orders of Columns, he muft underftand all the Meafures which are ordinarily given to Buildings, and to each particular thing, Gates, Windows, Chimneys, &c. and to place them well, and to take days fit for the purpofe, that he make not any thing like one eye or maimed, to take great care that every thing be right, nothing faulty, and that the fymmetry and proportion be kept, as much as one is able, otherwife
the

the Perspective, which is made for to content the sight, would offend it by its defects.

Goldsmiths, Embroiderers, Makers of Tapistry, Painters, workers in Silver, in Silk, and in Wool; Joyners, and all others that busie themselves in making designes, and with Painting, cannot let pass this Science, of Perspective, if they would do any thing that may be commendable.

The most part of those I have known to affect this Science, have assured me, that they have been beaten off by the great number of lines, that some Authors have set for to frame and finde the place of their Objects, Bodies, or Figures; others, by having met with too much obscurity in their Orders and Explications, and particularly, for that they have not set the Instructions over against the Figures, and that whilst that they turn over leaves to finde them, they forgat that which they desired to know. All these Complaints oblige me to be more clear, and more Methodical in the Instructions which I have set before every figure, that they might have before them the Manner to set into Practice that which they desire, applying my self to their capacity, without giving such Demonstrations as would obstruct or hinder them rather then clear them, using words which all may be able to understand, even in the Definitions, as one may see at the seventh fol. Having also given to certain things qualities which the common sort give to them, though that in effect they have them not. As for example, at the 15th. fol. where I discourse of the distance or removal far off, I have been constrained to say, against my thought, that it is the Apple of the eye which receiveth the Rays of the Objects, as if they were bounded there, by reason that I have experimented that when I say that the Vision is made upon the Retine, or fifth thin Membrane, at the bottom of the eye, that the Rays do but pass by the Apple, and that the representation,

tation, or fpecies of that which we behold are turned back ; it feemeth to me that *I* fpeak a new language, and that they cannot conceive that. Wherefore having confidered that this knowledge did little import for the Practice of this Art: *I* gave to the Apple that which appertaineth to the bottom of the eye, which is the true place of the vifion or fight, where the fpecies of the Objects are framed although others fay that it is in the Criftalline : Thofe which would be refolved in this, may look into *Aquilton Scheiner* and *des Cartes*, which have very well difcourfed thereof.

Although *I* have ufed all diligence poffible, for to render this Science very eafie, yet *I* doubt not but many may finde trouble therein at the beginning ; but he which fhall be able to furmount the difficulties, which he fhall finde at the firft ; there is nothing which he may not underftand and practice, fo that he be careful to underftand well, and retain one Order, before that he turn over the leaf : becaufe that they are, as it were linked together, and dependent the one of the other : this little pains will give the fatisfaction, by the eafinefs which one fhall have afterwards, in making all whatfoever he would.

It fhall be known by the Table following, that this Book fufficeth for to make all forts of Perfpectives, by ufing the orders, which the Figures and Letters fhall fhew, the which one may bring together to have that which one defireth, in which he that would make fome fair Perfpective, fhall be delighted to find prefently that which he fhall conceive will content his minde : and then he fhall have far more delight then if he copied a Piece wholly made by another ; and if one be conftrained to imitate any one, this fhall be done with facility, feeing that there are here orders, of all that poffibly he can meet with. I confefs freely that I have an incredible delight in making of new defigns, and in inventing of new pieces

which

which I would have publish:d, as others have don?, had it not been that my desire is, that every one should be partaker of this Recreation which he may take in composing them, & making them himself, having given him all the means, and the orders for to bring the same to pass. But if any one will not take this as pains, he shall find many of them all made already in *Marolois*, *Uredeman*, *Uriesse*, and others, which have taken delight to make their ingenuity appear therein.

So many, so fair, and excellent works have served to make some Painters lazy, that they will not learn to make that which they found already made; they are content only to design those the best that they are able, and as far as they understand them, the which would be tolerable, if they did imitate them well; but counterfeiting them without understanding, they make nothing that is good, giving ordinarily so many points in a Picture, as they shall meet with objects therein, lines and returns, they will make you see the under part of a thing, which as a certain one hath very well said, steal from particulars that which they give to the publick, to draw glory to themselves from the labour of others.

I had rather say freely, that *I* intending to make this little Treatise of Perspective; *I* would see, as far as I could, those which had written thereof, and take from one and others, that which might serve for my subject, afterwards to make a General Restitution, with which *I* have mingled a little of mine own, for to bind them together, and to follow an Order, which they had forgot to keep. The first that *I* found to have given some light to this Science, is *George Reich*, an *High-Germane*, in the tenth Book of his Works: After him *Viator*, a Cannon of Toul, which hath
given

given store of good Figures, but too little *Instructions.*
After him came *Albert Durer,* an excellent man, which hath
left some Rules and Principles amongst his Works in the fourth
Book of his Geometry: *John Cousin* also hath made a Book
thereof, wherein there are many good things. After those
came *Daniel Barbaro, Vignola, Serlio, du Cerean, Sirigary, Salo-
mon de Caus, Marolois, Uredement, Uriesse, Guidus Ubaldus, Pi-
etro, Acolti, le Sieur de Vaulizard, le Sieur Desargues,* and lately
the Reverned *P. Niceron a Minime,* whom *I* have seen all, the one
after the other, admiring their study and pains, for to serve
the Publick, esteeming my self much honoured to imitate
that which they done, and to be the unknown Copier of
their Works, besides those which I have nam d; there are
many other brave spirits, which have written thereon,
which I have not had the happiness to see, because I could not
attain to it This Multitude of Authors causeth sufficiently
to understand, that this Science hath been in all times cherish-
ed and esteemed by the most curious spirits, and more in that
age that we are in, then in any other pass'd, the which
maketh me to hope, that this little work will not dif-
please many, seeing that it bringeth Instructions, which
have not been seen for setting into Perspective, that which
falleth ordinarily under the senses, and by consequence gi-
veth the manner of making all sorts of Perspectives which a-
ny one can imagine.

I desire to proceed to cause it to be seen, and to teach
to set into Perspective all that may be set into it, not only
in Pieces level, and upon an united Plane, but also the bend-
ing, round and oblique, as for to paint within Roofs, fret-
tings or rais'd Works, Corners and Turnings again, ma-
king to appear square, or round, that which it shall not
be. In one word, all the Rarities and Deceits of Perspe-
ctive, whereof these ought to come forth first, being the
fuondations and principles of those which must follow.

If

If *I* shall know that they may be pleasing, and that they are look'd upon with a courteous eye, it shall be such a contentment and satisfaction to me, as *I* hope not for, and which shall easily compel me to acquit my self of my Promise.

A

given store of good Figures, but too little *Instructions.*
After him came *Albert Durer,* an excellent man, which hath
left some Rules and Principles amongst his Works in the fourth
Book of his Geometry: *John Cousin* also hath made a Book
thereof, wherein there are many good things. After those
came *Daniel Barbaro, Vignola, Serlio, du Cerean, Sirigary, Salo-
mon de Caus, Maroleis, Uredement, Uriesse, Guidus Ubaldus, Pi-
etro, Acolti, le Sieur de Vauliza, d, le Sieur Desargues,* and lately
the Reverned *P. Niceron* a *Minime,* whom *I* have seen all, the one
after the other, admiring their study and pains, for to serve
the Publick, esteeming my self much honoured to imitate
that which they done, and to be the unknown Copier of
their Works, besides those which I have named; there are
many other brave spirits, which have written thereon,
which I have not had the happiness to see, because I could not
attain to it This Multitude of Authors causeth sufficiently
to understand, that this Science hath been in all times cherish-
ed and esteemed by the most curious spirits, and more in that
age that we are in, then in any other pass'd, the which
maketh me to hope, that this little work will not dis-
please many, seeing that it bringeth Instructions, which
have not been seen for setting into Perspective, that which
falleth ordinarily under the senses, and by consequence gi-
veth the manner of making all sorts of Perspectives which a-
ny one can imagine.

I desire to proceed to cause it to be seen, and to teach
to set into Perspective all that may be set into it, not only
in Pieces level, and upon an united Plane, but also the bend-
ing, round and oblique, as for to paint within Roofs, fret-
tings or rais'd Works, Corners and Turnings again, ma-
king to appear square, or round, that which it shall not
be. In one word, all the Rarities and Deceits of Perspe-
ctive, whereof these ought to come forth first, being the
fuondations and principles of those which must follow.

If

If *I* shall know that they may be pleasing, and that they are look'd upon with a courteous eye, it shall be such a contentment and satisfaction to me, as *I* hope not for, and which shall easily compel me to acquit my self of my Promise.

A

A TABLE,

Inſtructing how to find the pieces that may ſerve to make any part of Perſpective.

THe *Art of Perſpective ought to begin by the planes , and according to reaſon, by thoſe that are the moſt eaſie, amongſt the which the ſquare , or the Cube , is the moſt eaſie, you may find how the plane thereof ought to be made, at the 19th fol. and its elevation, at the 44th. and 49th. folios. If one would have it ſeen by the Angle, its plane is at the 20th fol. and its elevation at the 50th. fol.*

For to elevate the Walls of an Houſe, or Hedge-Rows for a Garden, you muſt take the 51th and 52th fol. and you ſhall find there, with the planes the manner of elevating them.

Thoſe that would have the in-ſide of a Chamber, or of an Hall ſeen by the Front, ſhall find firſt the Walls, as we ſhall ſhew in the 51th and 52th fol. The Leaf following will give you the Doors, and the 54th fol. will ſhew how to make the Windows there. For to raiſe the Chimneys in what place ſoever you would, you muſt ſeek the 77th fol. After that you muſt lay there the Planchers, which may be found in the 55th and 57th fol? for the Pavements, there are of many ſorts in the 31. 32. 33. and 34th. fol? If one would have open Doors, the 93th fol. will ſhew how to do it, and the Leaf following ſhall be for opening the Windows. When there ſhall be two or three Stories, or Chambers, the one above the other, you muſt always keep the ſame Orders, and there ought to be but one only point for the view, as you may ſee in the 76 fol. for to aſcend into theſe Chambers there is an Aſcent turning, or Stairs in the 82. 83. and 84 fol.

Ordinarily all the Buildings which are viewed by the inſide, are garniſhed with ſame Moveables, he that will place ſuch there, ſhall find of all ſorts in the 96th fol. and ſo forward unto the 103 fol. For the meaſures of ſuch Figures, if any ſuch are to be placed there, they are to be found in the 122th. or 125th fol.

For to make a Church appear by the inſide, we muſt firſt reſolve upon a plane, and place that in the Perſpective, according to the two orders, that we have given there-

b

there-

thereupon in the 37th or 41th fol. You must raise the Walls, as is to be seen in the 51th fol. For the Windows, one may make them as the Arches of the 62th fol. er as in the 54th fol Except that there is no need of the cross-bars, and that they must be round above. If one would have Pilasters, or Pillers, they are to be found in the 48th fol. If one would have Columns there, he must take the Order for them from the 87th fol. After all that there must be made a bending Roof, or Roofs, if one would set it upon the sides fol. 68. 69. 70. 71. and 72. will furnish you with all sorts thereof.

The Ridge or top of the Church is made after another manner then bending sides, the Order for that may be found at the 74th fol. for to enrich it with Cornishes, Mouldings and other Ornaments, you must have recourse to the 88. 89. 90. 91. and 92. fol. for Altars, if one would have them there, you shall find the Method of making them in the 104 fol In the midst of the cross-bars of the Church one may make a Lanthorn or Cubeloe, as is to be seen in the 75. fol. The Pavement may be chosen in the 31. 32. 33. and 34 fol.

As for the Buildings without side of the Doors and Windows, they are made like the Buildings in the in-side, in the 53 and 54. fol. as may be seen in the 106. fol. When you shall have elevated them to the height that you think fit, you shall find the draught there to raise such a kind of covering, as you shall think most fitting in the 107. or 108. fol. If one would have there any Cornish, or other Ornaments, you may find how they ought to be placed in the fol. 88. 89. 90 91 and 92. Galleries Arch-wise, either for the out-side or in-side may be found in the fol. 63. 66 67. and 106. He that would make a whole street of Buildings, he must multiply the houses, and place them on the one side, and on the other, as one may see in fol. 109. When one shall make houses at a distance in the Perspectives, and that they shall be parallel to the Horizon, you ought to allow them the single draught only, without the thickness of the Doors or the Windows as I have made at the 110 fol. In the large open places, which are ordinarily in Streets in Perspective, one may raise a Pyramide there, the 80 fol. will shew how to elevate it, upon steps, or any other figure, or Statue, upon a Piedestal, the 91 fol. will furnish the Piedestal, and the 124 fol. will shew the figure.

When one would have Buildings seen by the left Angle he may take the planes of the fol. 19. 30. and make the Elevations as he shall find them in the fol. 50. and 111. which shall give Orders, how to make the Doors and Windows there.

Gardens made in Perspective do more delight the sight then any thing in the World, as well for the colour, that is so pleasing there, as for the variety of things which may be set there. The planes are to be made, as in the fol. 35. 38. or 113.

In

In the which one may make such divisions, as one shall desire. If we would have Bowers, the order therefore may be found in the 60. and 61. fol. If one should like better Hedges or Arbours, he may find them in the fol. 51. and 52. If instead of Bowers and Hedges, one would have a Wood, or Alleys of Trees, the 112 fol. will shew the Orders for divers sorts. When one would make Fountains there, or spouts of Water, the Round of the 29 fol. may serve for a Bason, its elevation is at the 73 fol. If one would have a square, he must take the fol 19 or 44. For to have thereof with divers quarters he must seek in the 45 or 46. fol. where he may find Polygones. He that would set Statues, or Figures upon Piedestals, which is a very fair Ornament for a Garden, he must take their measures in the fol. 122. or 125. If one would place there any Caves or Grottes, the 74 fol. will shew him how they ought to be made.

When one would cause an Ascent from one Garden to another, he shall find many sorts of steps in the fol. 78 79 80. and 81. Every one may choose amongst all these things, that which shall please him best, and may put them all there into the same piece, and withou confusion, only he must keep the proportions and symmetryes which ought to be observed therein.

If one would have Shops open, where there is nothing but the Walls, the 55 fol. will shew: If one would that they should be garnished with Boards or little Tables, he shall find the order thereof in the 105 fol. There is also another fashion for a Shop, which is not in the front like this, and whereof the Opening is altogether different, one may set it in the 95. fol.

Ampl theatres were heretofore more in use in Pictures, then they are at present, which is the cause that I have not set any of them here, accounting them unuseful here: If I shall know, that any one desire them, I will set forth some, in the second part in the mean time, if any one would raise up one thereof, he may use the plane, that is in fol 29. in the which he must make a greater number of Circles, according to the number and bigneß of the Stages, that he would have therein: For to raise the Stages, he must use the line of elevation, which he shall find in the 75. fol. As for Fortifications, he that would set them into Perspective, shall find the Method to reduce and abreviate the plane thereof in the 39 fol. and how they ought to be elevated in fol. 114.

The Treatise of Shadws, which beginneth at the 129. fol. unto the 150. teacheth how to give them to all sorts of Objects, whether they be caused by the Sun, by a Torch, or by the Candle.

As for all other things in particular, they are to be found according to the Order of the Table which is at the end of the Book.

SOME

DEFINITIONS

AND

PRINCIPLES

OF

PERSPECTIVE.

A

The Definitions, Names and Terms of the Points, Lines and Figures which we shall use.

THe point hath not any parts, as we see A, in figure. 1. In Perspective, there are three sorts thereof, which are called, points of sight, points of distance, and points contingent or accidental.

The line, is a length without breadth, as A B in figure 2. The Perspective hath five principle ones, the which it always useth. The 1. The line of the base or plane, as C D may be in figure 3. The 2. The line Perpendicular, or Plomb-line, which falling upon another, maketh the Angles on the one part and another equal, and these Angles are called Right Angles, and the line is Perpendicular to that upon the which it falleth as in the figure 3. A B and E F, falling upon C D, do make the Angle right in G. The 3. are lines parallel, These are lines the which being continued upon the same plane, and prolonged on the one part and other infinitely, will never meet together, as N O, in the figure 6. The Horizontal line, is no other thing, then a parallel to the base; We shall speak of it more largely in its place. The 4. is the line Diagonal, this is a line drawn from one Angle to another, as K L in the figure 10. And the 5. The line occult or pointed, is a line which ought to be made in white, or with points, as O N in figure 2. and these lines never ought to appear, when the work is finished.

The right Angle, is that which we speak of treating of Perpendiculars, I have set it apart by it self, that it may be better known what it is, by E F G, in figure 4.

There are two other Angles, under which are comprized all the Angles which are not right, the one is called the Obtuse which is more then right, as H L M, in figure 5. And the other sharp, which is less then right, as is H I K, in the same figure.

A term, is the end of any thing, as in the 2. A and B are terms or the ends of the line.

A figure, is comprized by one or by more terms, as in 7. 8. 9. 13. 14, &c. are figures.

The square, hath the four sides equal, and the four Angles right, A B C D, in fig. 7.

The Parallelogram, or long square, hath the four Angles right, but not the sides equal as C D E F, in fig. 8.

The Triangle Equilateral, hath the three sides equal, as G H I in fig. 9.

Section and Intersection of lines, are two lines which do cross and divide themselves in one point, as in the figure 11, the lines A B and C D, divide themselves in E.
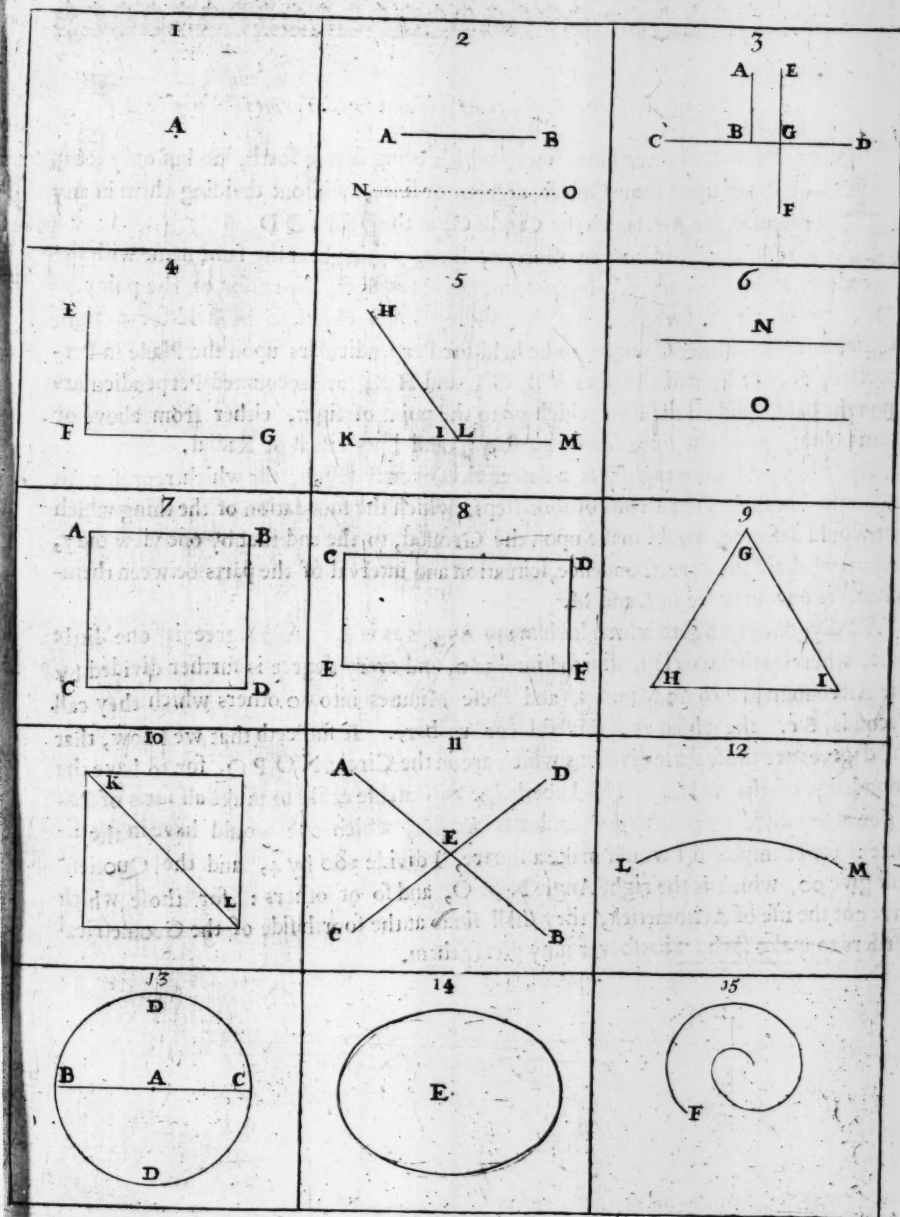
The bowed or crooked line, is that which is drawn by a Circuit from one point to another, as L M, in fig. 12.

A Circle or Round, is a plane figure, comprized in one line only, called a circumference, towards which all the lines coming from the Center are equal between themselves, as B C D of the figure 13, the point of the midst of the Circle A, is called the Center

The Diameter, is the right line B C of the Circle, the which passing by the Center of the Circle A, divideth it into two equally.

The Oval is a long figure, comprized within one line only, not Circular but bowed and Regular as E in fig. 14.

The Spiral or Volute, is a line, that is framed by two Centers, or by one only by Revolution or Diminution F, in fig. 15.

1	2	3
A	A———B N·············O	A E C———B—G———D F
4	5	6
E F———G	H K———I L———M	N——— O———
7	8	9
A———B C———D	C———D E———F	G H———I
10	11	12
K L	A D E C B	L⌒M
13	14	15
D B—A—C D	E	F

The Rest of the Definitions, Names and Termes.

Tangents are one or more lines, which being drawn forth, do but only touch or graze upon some Object, figures or lines, without dividing them in any manner, as A B touch the Circle C, at the points D D.

I have placed here two sorts of lines, which bear the same name with the Precedent, and which neverthelesse produce another effect, by reason of the point of sight, and of the Perspective, for the Angle E A B ought to be held for a right Angle, and all the lines C ought to be held for Perpendiculars upon the Plane in Perspective, as is D F, and the lines A B, G I, and H K, are accounted Perpendiculars upon the base, and all the lines which go to the point of sight, either from above or from below, or on the side, are called Rays, and lines visual or Radial.

The Plane or Ichnography, is a description or first design, the which representeth by single lineaments the Prints or foot-steps, which the foundation of the thing which one would describe, would make upon the Ground, to the end that by one view only, one may behold the correspondence, scituation and interval of the parts between themselves, as one may see in L and M.

A Polygone is a figure which hath many Angles as is L   A Degree is one little part, whereby the Circle is divided into 360, and every degree is further divided by the Astronomers into 60 Minutes, and these Minutes into 60 others which they call Seconds, &c. the which is not useful for us here. It sufficeth that we know, that the degrees are those little divisions which are in the Circle N O P Q, for to have the knowledge of the Angles. This knowledge will enable easily to make all sorts of Polygones, by dividing 360 by the number of Angles, which one would have in the figure : for example, if I would make a square, I divide 360 by 4, and the Quotient will give 90, which is the right Angle N M O, and so of others : for those which have not the use of Arithmetick, they shall finde at the fourth side of the Geometrical Orders to make such, whatsoever may please them.
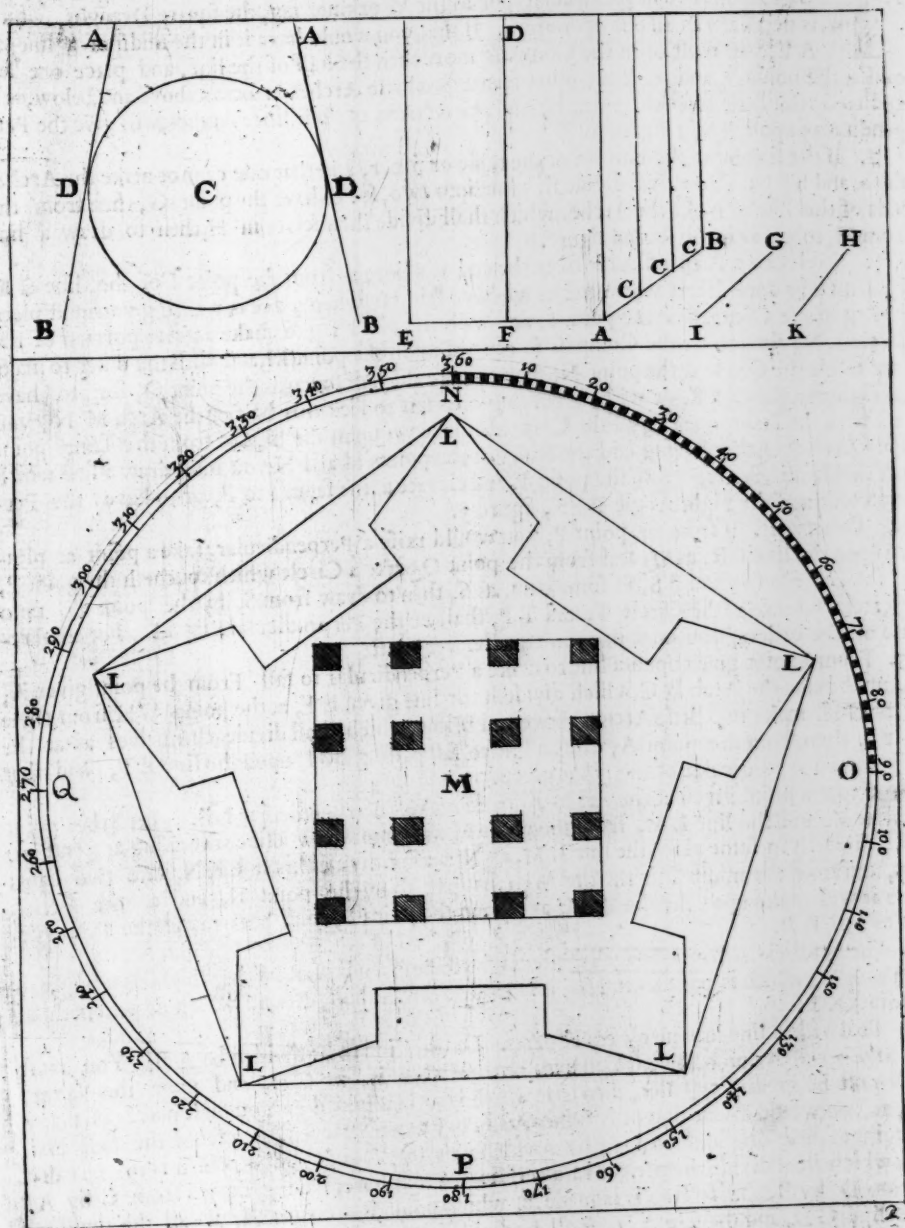
Some Orders of Geometry, for to make the Lines and Figures, which we are about to define.

1. FOr to make the Perpendiculars, or as the Workmen fay, the fquare Draught, which is neceffary in all our operations. If that you would have it in the midft of a line, as A E, you muft open the Compafs more then the half of the line, and place one leg of it at the point A, and with the other frame two little Arches or Bows above and below, as F and to do the fame from the point E, and the fections of thefe little Arches, will give the Perpendicular upon A E, 1 figure.

2. If the line be at the bottom of the table or paper, and that one cannot make the Arches above and below. You muft divide this line into two, for to have the point G, then from the ends of this line to make the Arches, which fhall divide themfelves in H, then to draw a line from H, to G, as in the fecond figure.

3. To elevate a Perpendicular from the end of a line, as from the point I of the line I K. This may be done divers ways, firft as we have faid, but when place is wanting you muft place one leg of the Compafs at the point I, and with the other leg to make a great portion of the Circle L M, then to fet the Compafs fo opened upon the point M, and with the other to make it to divide the Circle at the point N, then to take the half towards the point O, for to have the right Angle O I K, or without bufying ones felf to feek this half of the Arch M N, you muft with the fame, opening of the Compafs make yet upon the N, and from the fame point N, an Arch P Q, then having laid the Ruler at the points M and N, you muft draw a line which fhall divide this Arch P Q, at the point P, and elevate a line from I to P, for to have the Perpendicular and the right Angle P I K, figure 3.

4. Otherwife. If from the point P, you would raife a Perpendicular, take a point at pleafure upon the line P R, as Q, and from the point Q make a Circle which toucheth the point P, and fhall divide the line P S, in fome part, as S, then to draw from S, by the point Q, unto the circumference of the Circle T, and T P, fhall be the Perpendicular. fig 4. For to abreviate all the orders, you muft have an equaller very juft.

5. From a point given upon a line to make a Perpendicular to fall From the point given A, you muft make the Arch B C, which divideth the line given E F, at the points G H, from thefe points G H, make two little Arches above and below, which fhall divide themfelves as at the point I, then from the point A, caufe a line to fall pafling by I, upon the line E F, and that fhall be the Perpendicular of the point given.

6. From a point given at the end of a line to make a Perpendicular fall. Let the point given be K, and the line L M, from the point K, you muft draw a line traverfing at pleafure, which divideth in fome place the line L M, as N: after divide this line K N, into two equal parts, and from the midft O, make the Arch that paffeth by the point K, and at the fection which it will make upon the line L M, as P, and the point P, fhall be to make the Perpendicular to fall K P.

7. The parallels. For to be well made ought to be over half-Rounds, which they ought to touch as F G, which is parallel to H I, it is made over the half, Round which it toucheth at the points K L.

8. To divide a line into many equal parts. Let the line to be divided be A B. You muft draw another above or below, which may be parallel to it, as C D, and upon this latter, which muft be greater or leffer, then that which is to be divided : You muft make as many parts, as you would divide that of A B into, as in our example feven, then from the firft and laft point of thefe divifions, to draw lines which pafs by the ends of that which is to be divided, which fhall divide themfelves in a certain point as here, having drawn from C by A, and from D by B, the fection E is made, at which point F, you muft draw all the divifions of the line C D, and the line A B, fhall be divided as one defireth.

1

F

A ——————— E

F

2

H

G

3

P
Q
L   N
I   M   K

4

T
Q
P   S   R

5

A

B   G   H   C
E   F

6

K

L   P   N   M

7

K   L   G

H   I

8

E

A   B
C   D

IF the line A B, be given to make of it a square You muſt ſet one Leg of the compaſs, at the point A; and with the other leg take the length A B, and holding firm at the point A, with the other leg of the Compaſs, make the Arch B C, and make alſo from the point B, the Arch A D, which ſhall divide themſelves at the point E, without the ſide of the ſection, he muſt tranſport the half of the Arch A E, or B E, which ſhall be in the points D C, by the which drawing right lines one ſhall have a perfect ſquare.

After another manner. Upon the line A B, draw from the point A, a Perpendicular C A, equal to A B, then having taken with a Compaſs the length A B or A C, you muſt ſet the leg of the Compaſs at the point B, and with the other make an Arch, and do altogether the ſame from the point C, the ſection of theſe two Arches ſhall be the point D, for to frame the ſquare A B C D.

2. For to make a parallelogram or long ſquare: Draw a Perpendicular greater or ſmaller then E F, as E G, then having taken the height E G, ſet a leg of the Compaſs at F, and with the other make an Arch, take alſo the length E F, and ſet a leg of the Compaſs in G, and make a ſecond Arch then divide the firſt at H, and you ſhall have that which you deſire, you muſt always obſerve the ſame thing, for all the four right Angles.

Of Polygones Circular, which are Figures with divers Angles within one Circle.

3. For the Triangle equilateral You muſt ſet the half Diameter at the point A, and deſcribe the Arch D E, and draw a line D E, this line ſhall be the ſide of the Triangle, D E F.

4. For the ſquare draw 2 Diameters at right Angles, & joyn their ends, this ſhall be the ſquare A B C D.

5. For the Pentagone or five Angles. Make 2 Diameters, and take D G, the half of the Demy-Diameter D I, and from the point G, of the Interval G A, make the Arch A H, the ſubtendent H A, ſhall be the ſide of the Pentagone.

6 For the Hexagone, or ſix Angles. The half Diameter is the ſide of the Hexagone.

7. For the Heptagone or ſeven Angles. Take the half of the ſide of the Triangle Equilateral A.

8. For the Octogone or eight Angles Take the half of the quarter of the Circle

9 For the Ennagone or 9 Angles. Take the 2 thirds of the half Diameter, as E B, for its ſide.

10. For the Decagone or ten Angles: Take an half Diameter and divide it in two at the point G, then from the point G, and the interval G A, make the Arch A B, the part of the half Diameter B C, ſhall make the ſide of the Decagone.

11 For the Hendecagone or eleven Angles. Make two Diameters at right Angles, and from the point A, make the Arch B C, of the interval of the half Diameter, then from the interſection C, unto the E, draw a line C D. This is the ſide of the Hendecagone.

12. For the Dodecagone, or twelve Angles, divide into 2 the Arch of the Hexagone A B, the ſubtendent ſhall be the ſide

13. The Oval is made of many faſhions and all compoſed of portions of the Circle, or of one only line by two Centers, the moſt commonly uſed are theſe. Having made a Circle with 2 Diameters, as A B C D, from the points A B, we muſt make more two circles equal to the firſt, then from the point D they draw a line by the Center of the laſt Circle A, unto the circumference E, then ſetting a leg of the Compaſs at the point D, with the other, you muſt take the interval E, and make the Arch E F. You muſt do as much on the other ſide, and the Wall will be made.

14 For an Oval more round. You muſt draw one only line, and make a Circle, of the Center A, and from the ſection of this circle upon the right line at the point B, this ſhall be the Center of another Circle. To frame the Oval, you muſt take with a Compaſs all the Diameter of one of the Circles, as from the point A to the point E, and ſet at the ſections of the two Circles D E, a leg of the Compaſs, and with the other leg make the Arch D G H, and to do the ſame from the point E.

15. There is another manner of making of Ovals very eaſie, and more uſeful then the former, ſeeing that by one and the ſame Order, they be made long, narrow, large, ſhort, &c See here how they are made. You muſt upon a right line ſet two nails, or two pins, which ſerve for the Center, as A B, for to faſten a thread or ſmall cord of the height and largeneſs that you would have the Oval, as is the pack-thread A B C : you muſt hold this thread bended with a feather or pencil, which you ſhall turn, until that you be arrived where you have begun. If you would make it longer, lengthen out the Center, and do the contrary, if you would have it ſhort : for if you ſet the two nails cloſe one to the other, you ſhall have a Round.

16. For the Volute, or line like unto the Spiral, take two points upon one line, as A B, let theſe two points ſerve for a Center, the one after the other : for example, having made the half-round A B, ſet again the leg of the Compaſs on B, and with the other leg take the length A, and make an half-Circle A C. Then holding one leg of the Compaſs at A, you muſt take the diſtance A C, and make the half-Round C D, and ſo often as you pleaſe, changing only the Centers. *Vignola* giveth it another faſhion.

1. Square — C D A B
2. Parallelogram — F H E G
3. Triangle — F D E A
4. B A C D
5. Pentagone — A H I G D
6. Exagone
7. Eptagone — A
8. Octogone
9. Enneagone — B E
10. Decagone — A B C G
11. Endecagone — E D B A
12. Dodecagone — B A
13. F C E B A D
14. G H E A D B
15. C A B
16. P A B C

B
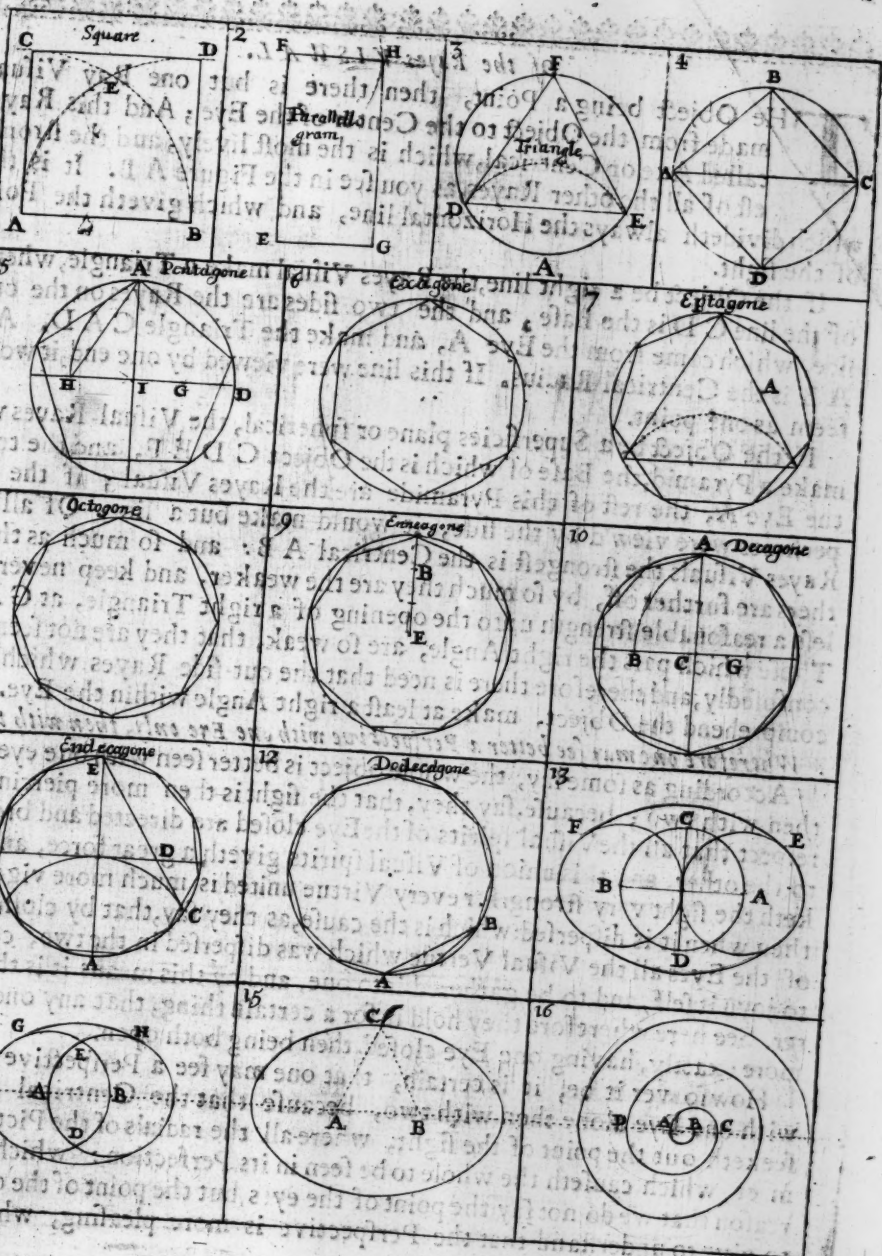
Of the Rayes VISUAL.

THe Object being a Point, then there is but one Ray Visual made from the Object to the Center of the Eye ; And this Ray is called Axe or Centrical, which is the most lively, and the strongest of all the other Rayes, as you see in the Figure A B. It is this which divideth always the Horizontal line, and which giveth the Point of the sight.

If the Object be a right line, the Rayes Visual make a Triangle, whereof the line C D is the Base, and the two sides are the Rayes on the outside, which come from the Eye A, and make the Triangle C A D. And A B is the Centrical Radius. If this line were viewed by one end, it would seem as one point.

If the Object be a Superficies plane or spherical, the Visual-Rayes will make a Pyramid, the Base of which is the Object C D E F, and the top is the Eye A, the rest of this Pyramide are the Rayes Visual ; if the Superficies were view'd by the side, it would make but a line. Of all the Rayes Visuals the strongest is the Centrical A B : and so much as the others are further off, by so much they are the weaker, and keep nevertheless a reasonable strength unto the opening of a right Triangle, at G A P. Those which pass the right Angle, are so weak, that they are not seen but confusedly, and therefore there is need that the out-side Rayes which may comprehend the Object, make at least a right Angle within the Eye.

Wherefore one may see better a Perspective with one Eye only, then with two.

According as some say, the whole object is better seen with one eye only then with two ; because, say they, that the sight is then more piercing, in respect that all the Visual spirits of the Eye closed are directed and brought to the other, and this union of Visual spirits giveth a great force, and maketh the sight very strong: for every Virtue united is much more vigorous, then when it is dispersed: which is the cause, as they say, that by closing one of the Eyes all the Visual Vertue which was dispersed in the two, cometh to joyn it self, and to be gathered into one, and by this means it is the better. See here wherefore they hold it for a certain thing, that any one seeth more exactly, having one Eye closed, then being both open.

Howsoever it be, it is certain, that one may see a Perspective better with one Eye alone then with two, because that the Centrical Radius seeketh out the point of the sight, where all the radials of the Picture do meet, which causeth the whole to be seen in its Perfection : which is the reason that we do not say the point of the eyes, but the point of the eye : for to give to understand that the Perspective is more pleasing, when it is viewed with one eye only.
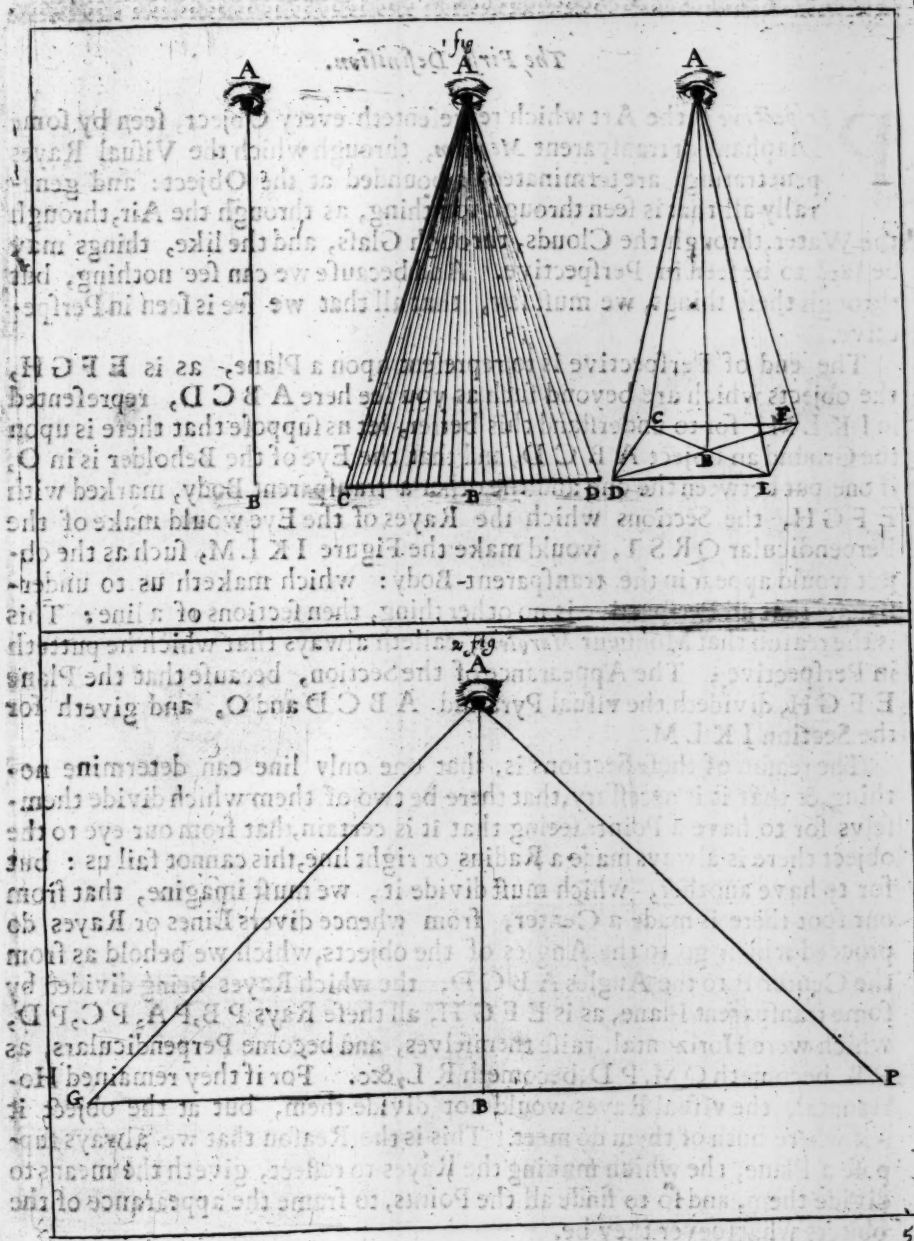
The Firſt Definition.

P Erſpective is the Art which repreſenteth every Object, ſeen by ſome
    Diaphane or tranſparent *Medium,* through which the Viſual Rayes
    penetrating, are terminated or bounded at the Object: and gene-
    rally all that is ſeen through ſomthing, as through the Air, through
the Water, through the Clouds, through Glaſs, and the like, things may
be ſaid to be ſeen in Perſpective. And becauſe we can ſee nothing, but
through theſe things, we muſt ſay, that all that we ſee is ſeen in Perſpe-
ctive.

The end of Perſpective is to repreſent upon a Plane, as is E F G H,
the objects which are beyond ſuch as you ſee here A B C D, repreſented
in I K L M: for to underſtand this better, let us ſuppoſe that there is upon
the Ground an object A B C D, and that the Eye of the Beholder is in O,
if one put between the one and the other a tranſparent Body, marked with
E F G H, the Sections which the Rayes of the Eye would make of the
Perpendicular Q R S T, would make the Figure I K L M, ſuch as the ob-
ject would appear in the tranſparent Body: which maketh us to under-
ſtand, that all Perſpective is no other thing, then ſections of a line: This
is the reaſon that Monſieur *Marolois,* calleth always that which he putteth
in Perſpective; The Appearance of the Section, becauſe that the Plane
E F G H, divideth the viſual Pyramid A B C D and O, and giveth for
the Section I K L M.

The reaſon of theſe Sections is, that one only line can determine no-
thing, & that it is neceſſary, that there be two of them which divide them-
ſelvs for to have a Point: ſeeing that it is certain, that from our eye to the
object there is always made a Radius or right line, this cannot fail us: but
for to have another, which muſt divide it, we muſt imagine, that from
our foot there is made a Center, from whence divers Lines or Rayes do
proceed which go to the Angles of the objects, which we behold as from
the Center P to the Angles A B C D, the which Rayes being divided by
ſome tranſparent Plane, as is E F G H, all theſe Rays P B, P A, P C, P D,
which were Horizontal, raiſe themſelves, and become Perpendiculars, as
P B. becometh Q M. P D, becometh R L, &c. For if they remained Ho-
rizontal, the viſual Rayes would not divide them, but at the object it
ſelf where both of them do meet. This is the Reaſon that we always ſup-
poſe a Plane, the which making the Rayes to reflect, giveth the means to
divide them, and ſo to finde all the Points, to frame the appearance of the
objects whatſoever they be.
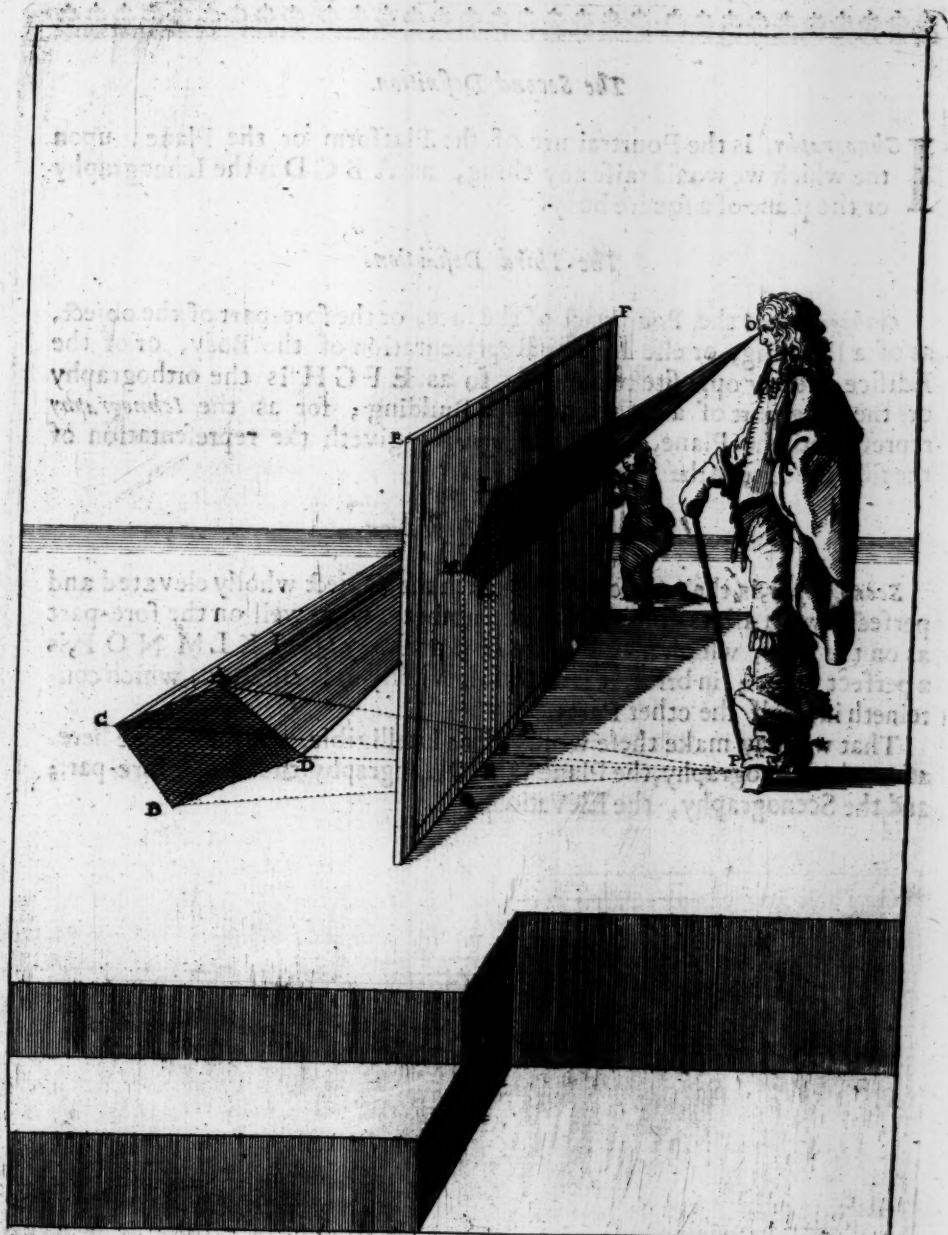
The Second Definition.

Ichnography, is the Pourtraiture of the Platform or the Plane, upon the which we would raise any thing, as A B C D is the Ichnography or the plane of a square body.

The Third Definition.

Orthography is the Pourtraict of the face, or the fore-part of the object, as of a Building, or else it is the Representation of the Body, or of the Edifice directly opposite to our eye, so as E F G H is the orthography or the fore-part of a Cube, or of a Building; for as the *Ichnography* representeth the Plane, so the *Orthography* giveth the representation of the side opposite to the Eye.

The fourth Definition.

Scenography, is that which representeth the Object wholly elevated and perfect, with all its diminutions and umbrages, as well on the fore-part as on the sides, which may be seen, and are above, as I K L M N O P, is a perfect Cube; in brief, it is the work wholly accomplished, which conteineth in it self the other Parts.

That we may make these words more Intelligible, we shall name hereafter the Ichnography, the Plane; the Orthography, the face or fore-part; and the Scenography, the Elevation.

1. fig.

B   C

A   D

2. fig.

F   G

E   H

3. fig.

N   O
K   L

P

I   M
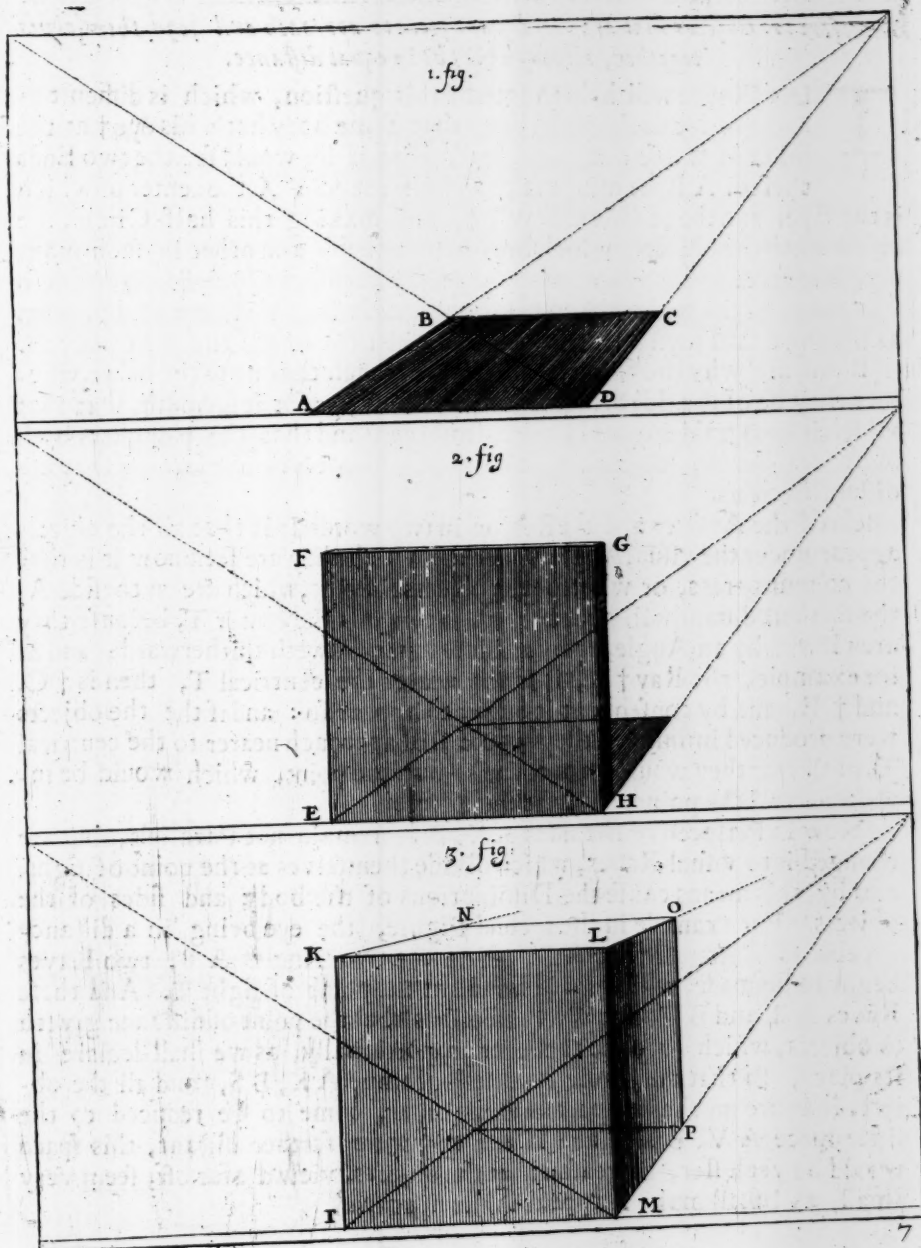
Wherefore the Objects that are far distant seem to approach and joyn themselves together, although they be in equal distance.

THis Figure will help to satisfie this question, which is difficult enough ; let us suppose then, that some body hath his eye † at the midst of a line : it is evident, that if he would see the two Ends thereof A B, he must make an half-round V X, the center of which is the Eye, and the centrical Ray † †, and making this half-Circle, he discovereth the objects, which are on the one side and other in such manner, that it seemeth to him. that the farthest distant of the side A, seem to come near to the center †. And those on the side B go thither also, and seem as if they would joyn themselvs, as much as the one and the other side can.

If one ask why the things so distant, approach the one to the other, whether they be of the side either above or below us : for it seemeth, that that which is on our sides would joyn themselves, and that the planchers both above and below, do raise up and abase themselves the farther they are distant from us.

Behold the Answer and the Reason in two words: It is that all the objects appear, under the visual Angle, under the which they are seen: now it is that the columns, trees, or whatsoever objects they be, which are on the side A, the farthest distant will appear to draw towards the center T, because they are viewed by an Angle, or by a Radius that draweth thitherward ; and as for example, the Ray † K, is much nearer the centrical T, then is † C, and † E, and by consequent it ought to appear so : and if the the objects were produced infinitely, they would still approach nearer to the centrical T, until that they would seem to make but one point, which would be infinite, as all the points of sight ought to be.

Now in Perspective the sides A K, B S, remain not Parallels, but are changed into visual Rayes, which divide themselves at the point of sight, and by this means cause the Diminutions of the body and sides of the objects. For example in the second Figure, the eye being in a distance capable of seeing the line A B, from the two Angles A B, two Rayes begin to be made, which go to finde out the point of sight T. And these Rayes A T and B T, receive the sections that the point of distance giveth to objects, which do close together proportionally, as we shall declare in its place, so that the whole Parallellogramne A K, B S, and all the objects that are on the one part and the other, come to be reduced to the little space A V, B X: and if the eye were farther distant, this space would be yet lesser, by reason that the objects, view'd afar off, seem very small, as I shall make it appear in the next leaf.

1. *Fig*.

A   C   D   E   F   G   H   I   K

V

J

T

X

B   L   M   N   O   P   Q   R   S

2. *Fig*

K   I   H   G   F   E   D   C

V   KIHGFED

T

X   RQPON ML

S   R   Q   P   O   N   M   L   B
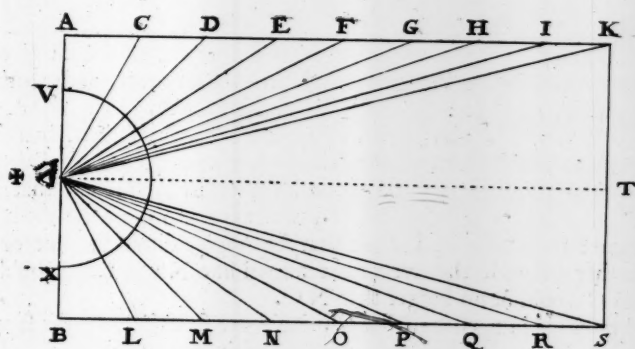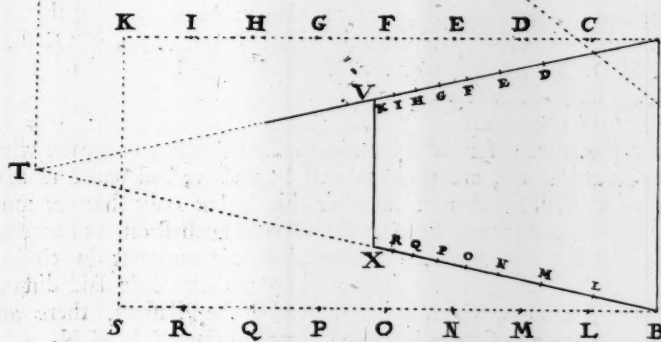
Wherefore the Objects draw near to each other, being view'd afar off.

WE have already said, that things do appear according to the Angle, in the which they are view'd ; this Angle is taken at the Eye, where the lines do meet that do compute the Object : for example, the first Object being B C, if the Eye A look upon it, it will cause the Rayes A B and A C, which give the Angle B A C : so that an Object seen in a great Angle will appear great, and another seen in a little Angle will appear little : Now it is, that the Objects being equal, those that are farthest off are view'd in a less Angle : we must conclude then, that the Objects farthest off, ought to be the least in Perspectives : for example, if the Eye be in A the Object B C, which is the first, will appear to it the greatest, because that it is viewed by a greater Angle, the 2 3 4 and 5 Objects, will appear to it always the less, although that they be equal : the reason is, because that the Angles diminish ; according as the Objects are farther distant if the Eye were remitted into N L K L, it would appear the greatest, and B C would be no bigger then N O.

This second figure is in pursuit of that which we are speaking of : for supposing, that the Objects appear such, as is the Angle within which they are viewed ; it followeth thence, that if one draw many lines under one and the same Triangle, that they ought to appear equal amongst themselves : so we say, that all the lines which are comprised between the lines of the Triangle N O P, will appear equal amongst themselves. Now seeing that all the Objects comprised by the same Angle seem equal, those which shall be comprised by a greater Angle will seem greater, and those that shall be comprised by a less Angle will seem less.

Supposing that which we have said, if there were a quantity of Columns or Pilasters of one side and the other in an Hall, it would be of necessity that the Objects should be under the same Angle, and that all should proceed unto one point, which is within the Horizon O. For example, the Eye being in A, discovering the first Object D E if from the points D E, one draw the visual Rayes, D O, E O, they will make the Triangle D O E, which will enclose the Pilasters D E, F G, H I, K L, M N, whence they ought to appear all equal.

That which we have said concerning the sides, ought to be understood likewise of the pavements and planchers : for the diminutions of the Angles, under the which we see the Objects that are far off, are made as well both above and under us as on the sides. Wherefore we shall say thereof no other thing, but only that we must observe that there be as many squares between the Objects farthest off, as between those that are nearer : for although that the Objects which are remotest do close themselves, the more far they are off : yet they cease not to keep their said distance, as we may see between B C D E, which is the Interval of the Pilasters, there are sixteen squares. There are also sixteen between the most distant K L M N.

1. Fig
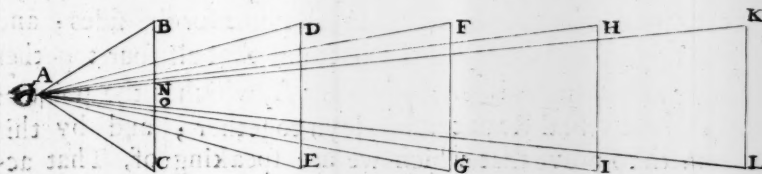
2. Fig.
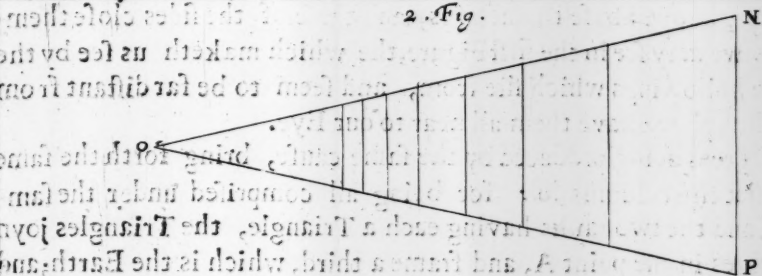
Fig 3
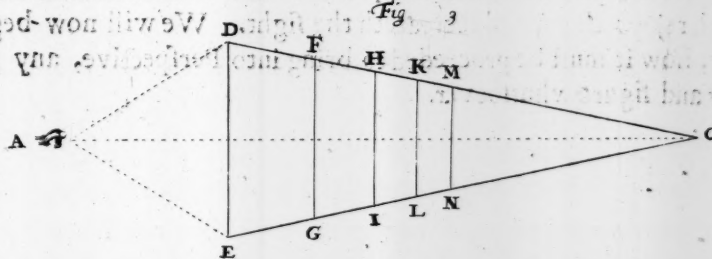
Fig 4
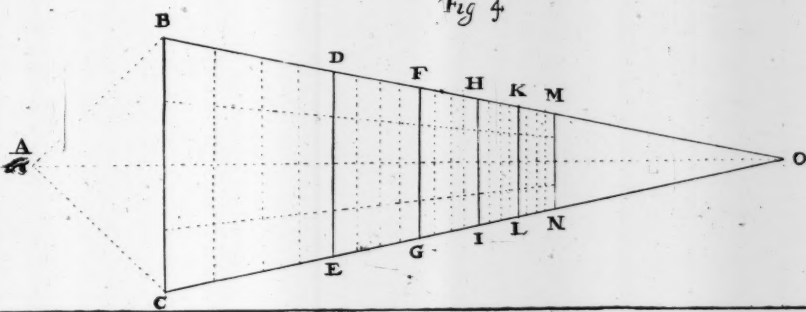
IT followeth on that which we were speaking of, that if one joyn together two Triangles, as in the last, but one for the sides; and two of the last for the top and the bottom, that all four together will bound themselves in one only point A, which is the point of sight where all the visual Rays come to joyn together; and by this means it cometh to prove that which we are speaking of, That according to the measure of the distance of the Objects, they come to close together; those which are below raise themselves, and those which are above abase themselves, and those of the sides close themselvs, as we may see in the first Figure, the which maketh us see by the Eye the hollowings which flie from, and seem to be far distant from us, although we have them all near to our Eye.

The Trees being produced by the same cause, bring forth the same effect that the columns do: for being all comprised under the same Angle, and the two ranks having each a Triangle, the Triangles joyn themselves in one point A, and frame a third, which is the Earth; and the fourth, if you will, shall be the Air: and so affordeth us a delight which rejoyceth us, and recreateth the sight. We will now begin to shew, how it must be proceeded to bring into Perspective, any plane, body and figure whatsoever.

C iij
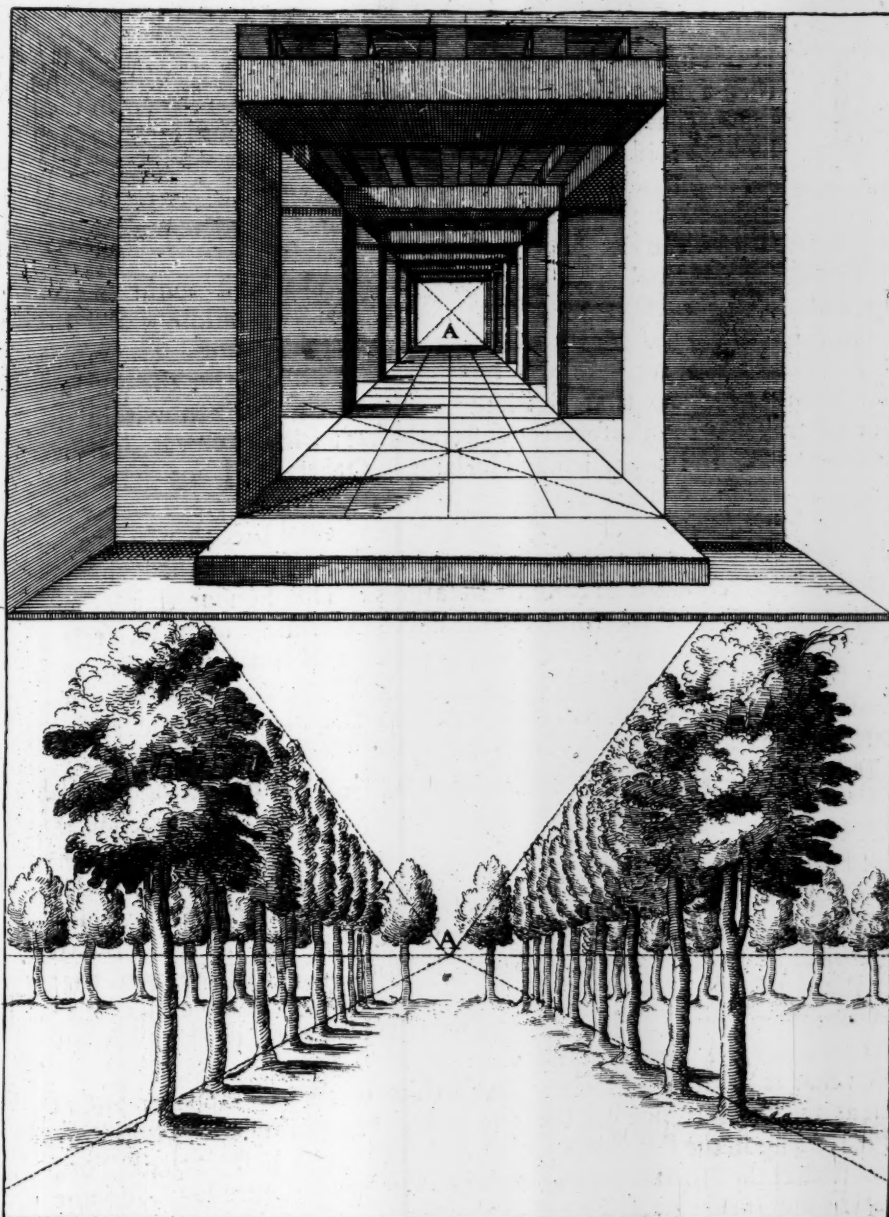
Of the Horizon.

THE Horizon in the Art of Perspective, is no other thing then a line which giveth us the height of our Eye, in such manner, as, if we be rais'd as the first man, our Horizon shall be high: if we be but of our own height, as the second man: it will be but of our height: and if we be lying or set, as the third, our Horizon will be low: so that the Horizon sheweth how much the Eye is elevated from the Earth.

This is the principal Piece of the Picture, and which ought to give the Rule to all the rest, as well for the bending of the Buildings and Architectures, as for the Measures and heights of the Figures. The which hath caused a petty dispute between the best Painters; for the one say, that it must needs be that all Pictures have their Horizon within the work, and that the Perspective suffereth that a Picture elevated above the Eye, beareth its particular Horizon. Others will not have this second Horizon, and use always the Natural, in what place soever the Picture be placed, imagining that all the height and bredth which they have before them is as a great Piece or Picture, of which that which is elevated in effect ought to take its Measures: The honour that *I* bear to the one and the other, suffereth me not to determine upon it, seeing that many good Authors have suffered them both. But if any one should press me to speak my opinion, I would say freely that I am of the opinion of the latter, by reason that all that is in the Picture would appear there more natural.

This line beareth always the Points of sight, of distance, and sometimes the Contingents or Accidental: in brief, this is that which separateth the Heaven from the Earth, and which limiteth the sight: it is always Parallel to the bottom of the Picture or Plane, upon the which the Object is placed: whence it appeareth, that one cannot set any thing above the Horizon, which surpasseth not the height of the Eye. But if the Object be so high, that it passeth this Horizon, it must be then, that the Plane of the same Object be above: as for example, a Tree or a Mountain may well have its Top above the Horizon; but nevertheless the foot thereof is far on this side.

All that is below the Horizon, maketh its upper part appear, and as soon as one is past it, one can see it no more. For example, the two Pieces placed upon the foundation of the first figure A B shew their Top, because that the Horizon is above that of the second figure D C, do not shew it: and if they be as it were in the same line, by greater reason, those of the third E F ought less to shew it, seeing that they exceed it very much: they are nevertheless as high the one as the other, it is then the Horizon that causeth this difference.

1 fig.

Horiſon

B

A

2 fig.

Horiſon

C

D

3 fig.

Horiſon

E

F
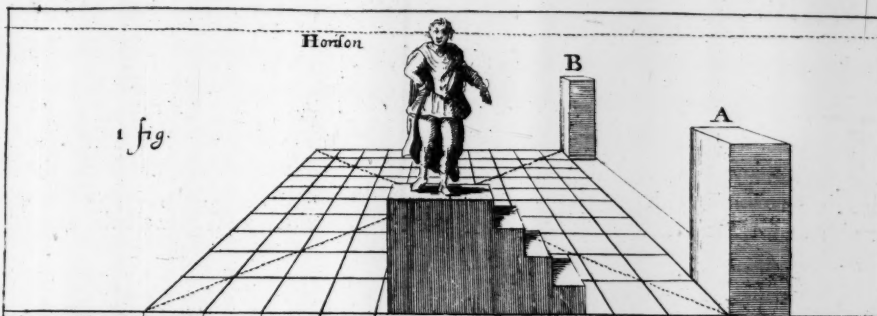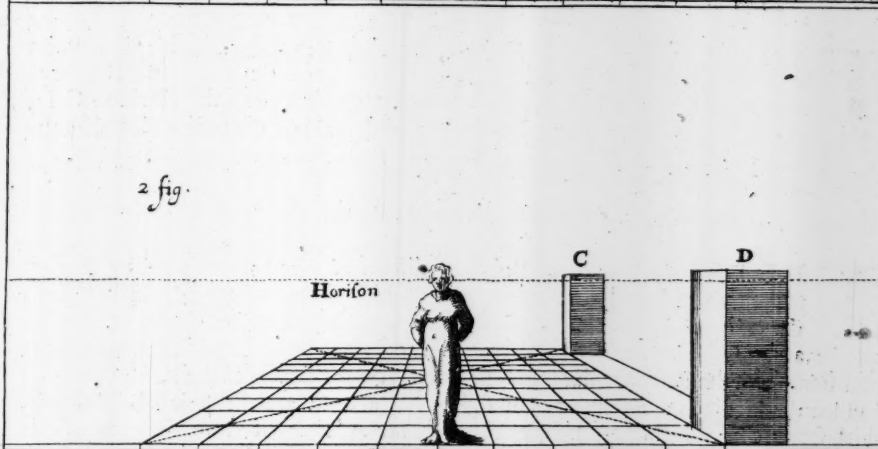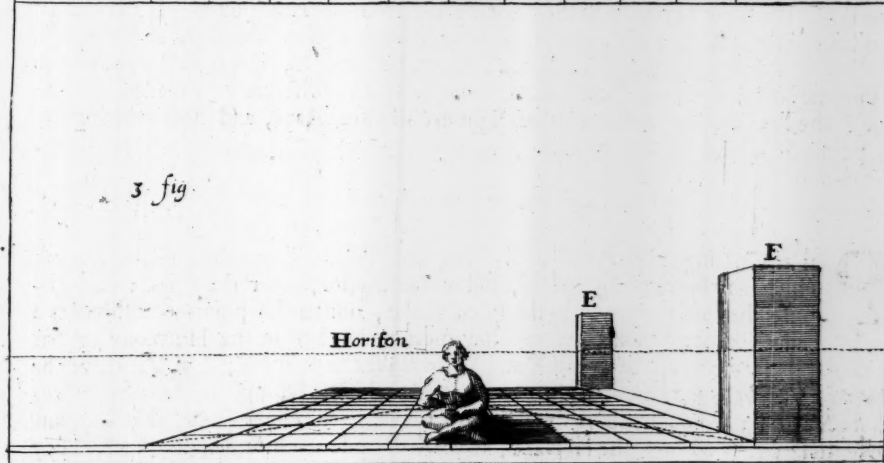
Of the Base.

THE Base of the Plane. This is the line upon the which the Object ought to be, and every Object hath its own, the which is always Parallel to the Horizon, as is A B of the first Figure : F G of the second : N O of the third : This line serveth sometimes to give the lengths and the bredths, as we shall see afterwards. It is always the bottom of the Picture which must give all the Measures.

Of the Point of sight, Point of Perspective, Point Ocular, or Point Principal.

THE Point of Sight, of Perspective, Principal or Ocular. This is a Point which maketh the Axis of the Eye, or the Centrical Ray above the Horizontal line, as E of the first Figure is the point Ocular above the Horizon C D, at which all the lines or visual Rayes ought to joyn themselves : It is called also the point of the Eye, by reason that it is opposite to him which looketh upon it.

Of the Points of Distance.

THE Point of distance, or Points of distances. Is a point or points (for they make two, although it be not necessary)which are to be set equally distant from the point of sight: They call them points of distance : because that the Person must be as much distant from the Figure, or Picture, and from the base, as these points are distant from the Point Ocular, and they must always be within the horizontal line, as H I is the Horizon : K, the point of sight : L and M are the points of distance, which serve to afford all the Abridgements. As for example, if from the ends of the line E G, one draw two lines to the point K, and from the same points F G, one draw two lines to the points of distances M and L, where these two lines G L and F K shall be divided at the point X, and G K, and F M, at the point Y, this shall be the line of sinking or hollowing, and the abridgment of the square, whereof F G is a side and the base : the lines that go to the point of sight are all visual Rays, and those which go to the points of distance are Diagonals.

Of Points Accidental.

POints Contingent or Accidental. Are certain Points where the Objects do end, which may be cast negligently, and without order, under the Plane : it is because they are not drawn to the Point ocular, nor to the points of Distances : but by chance and at adventure, where they meet each other in the Horizon : as for example, these two pieces of wood X and Y, do make the points V, V,V, V, above the Horizon P and Q, and go not to the point of sight which is R, nor to the points of distance S and T : And sometimes the Bodies or Objects are so ill ordered, that one must make these points without the Horizon, as we shall cause to be seen in its place. They serve also for the Openings of doors, of windows, of stairs, and such like things. The which shall be seen hereafter.

D   Horizontal   E   Line   C

Visuall Ray   Visuall Ray

1. Fig.

B   The Base   A

M Point of Distance   Point K of Sight   Point of Distance L
I   H

Y   X

2. Fig.

Visuall Ray   Diagonall Line   Diagonall Line   Visuall Ray

G   The Base   F

Q T Point accidentall   Point of Sight   Point accidentall S P
Distance V V   Horizontall   R   Line   V   V Distance

3. Fig.

The Base
O   N

❦❦❦❦❦❦❦❦❦❦❦❦❦❦❦❦❦❦❦❦❦❦
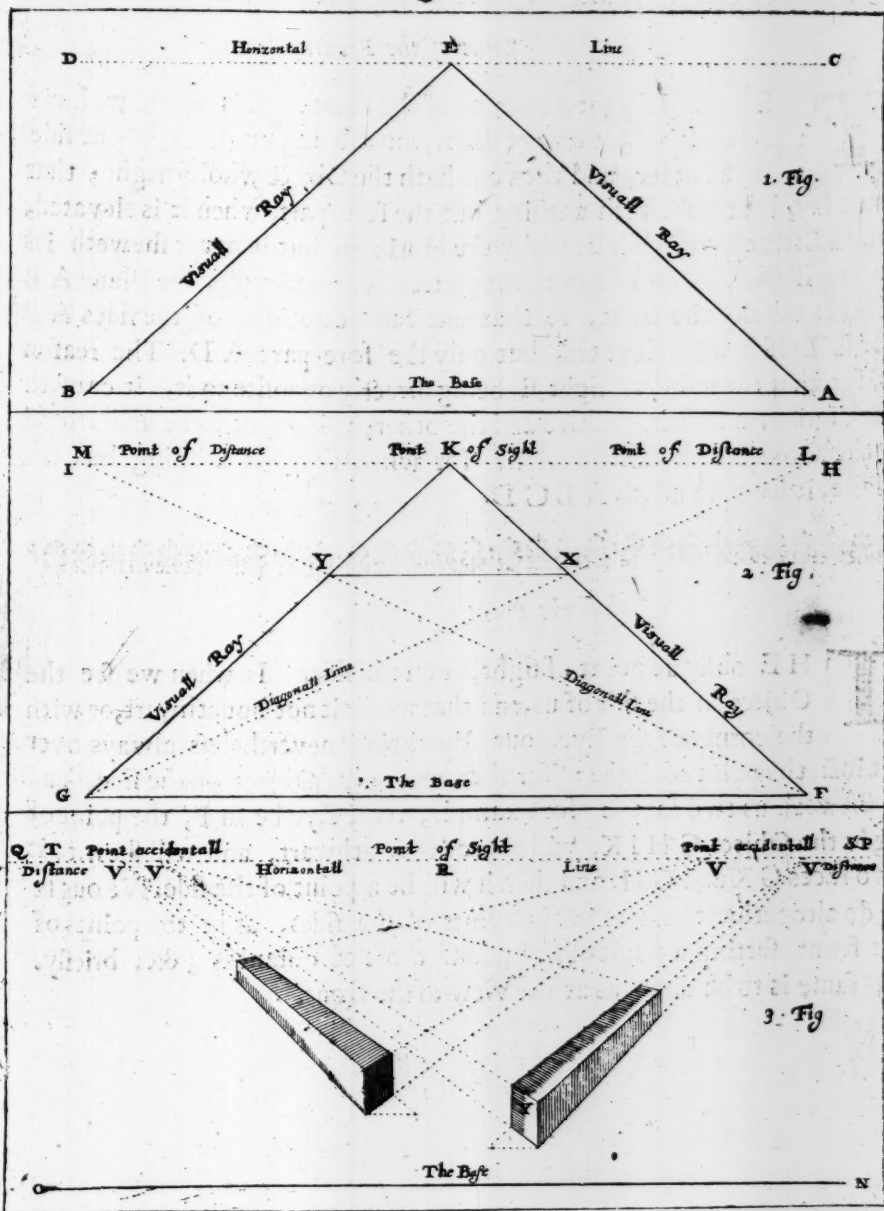
Of the Point of the Front.

THE point of sight direct, or of the front; it is when we have the Object whole before us, without being more on the one side then the other, and then one hath the Object wholly right; that is to say, that it sheweth nothing but the fore-part, when it is elevated, and a little above, if it be under the Horizon, but it never sheweth its sides, if the Objects be not a Polygone. For example, the Plane A B C D is wholly the front, so that one can see nothing of the sides A B nor C D if it were elevated, but only the fore-part A D. The reason is, for that the point of sight E, being directly opposite to it, it causeth the diminution of the one side and the other; this ought to be understood if the Object were an Elevation: for when there is nothing but the Plane, it sheweth all, as A B C D.

❦❦❦❦❦❦❦❦❦❦❦❦❦❦❦❦❦❦❦❦❦❦

Of the Point of the side.

THE oblique point of sight, or on the side. Is when we see the Object on the side of us, and that we see it not but athwart, or with the corner of the Eye, our Eye being nevertheless always over against the point of sight: for then we see the Object on the side, and it sheweth us two faces: for example, if the Eye be in F, the point of sight the Object G H I K, will appear to it athwart, and will shew to it two faces G K and G H, and then it will be a point of the side. We ought to do altogether the same in the points of the sides, as in the points of the front, setting a point of sight, and those of distances, &c. briefly, the same is to be done, as at the view of the front.

1. Fig

E Horizon

B   C

A   D

2. Fig

Horizon

F

H   I

G   K
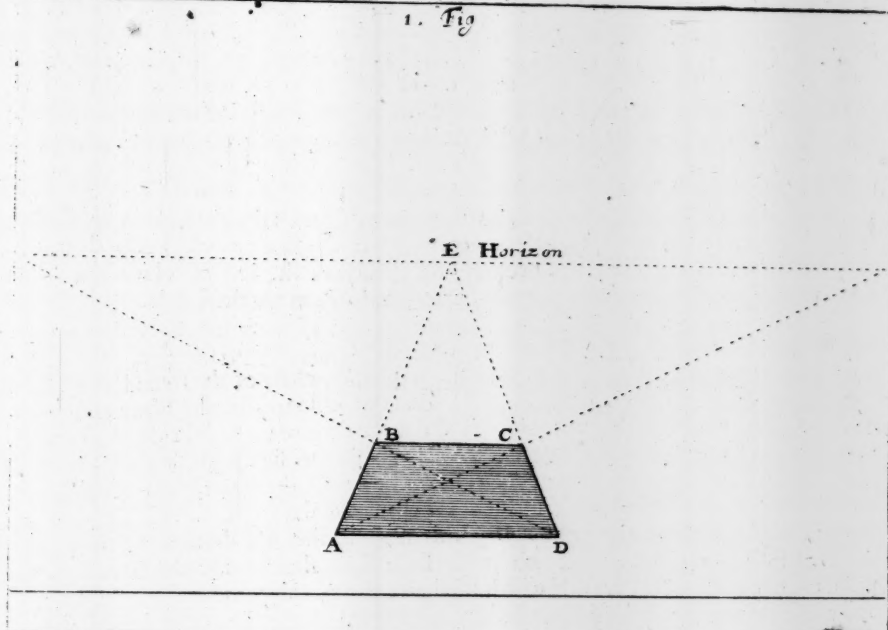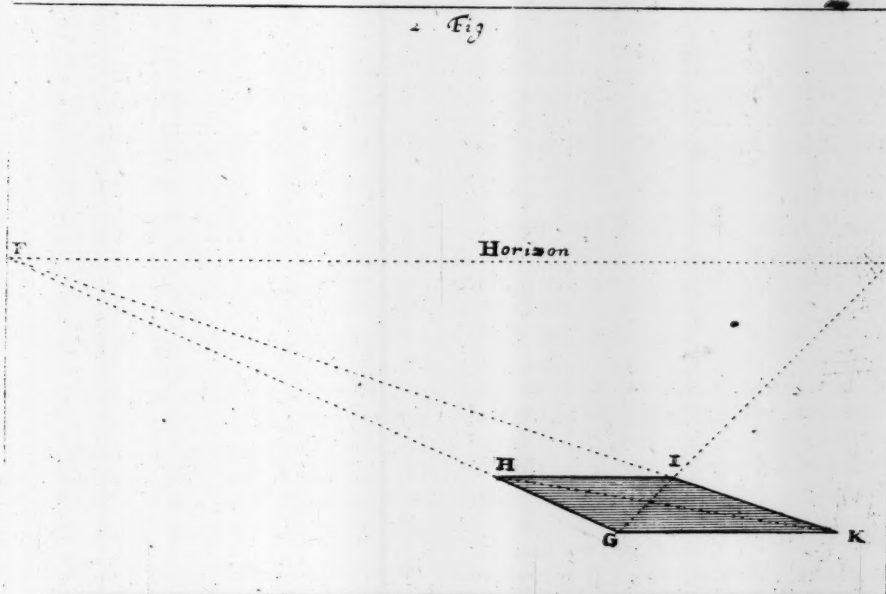
Of the visual Rayes.

THIS is a general Maxime, That all the lines which are Perpendicular to the base, within a Geometral Plane, ought always to be drawn at the point of sight, when one would set the same Planes in Perspective; for example, in the little Plane of the first figure the base is AB, upon which all the lines Z are Perpendicular to it.

This being supposed, that if one give a less or a greater line then that of the Plane, as the great line A B, which hath the same number of divisions with the little one, and from all these divisions Z, one draw to the point of sight all these lines of Z to E, they will all be perpendicular to the base, according to the Reasons of Perspective, we may also name them Radial, and properly visual Rayes : the last of which are called Extremes, by reason that they are at the end of the base, as are these A B.

Of the Diagonals or Diametrals, and of their sections.

IT is also a Maxime, that all the Diagonals of squares in Perspective, are drawn at the Point of distance. For example, at the little Plane of the second Figure, the Diagonals D O, F O, are drawn at the points of distances in the Plane in Perspective, the which maketh that the points of distances do give us the Abridgements of the Objects, that the point of sight doth remove from us : in such manner (as we have already said) that if one draw from the ends of the line of the base F G to the points of distances L M, they shall be Diagonals ; and where the lines shall divide the outmost Rayes F K and G K, at the points O ; this shall be the Abridgment of the square, whereof F G is one side : and where the same lines shall divide the lines Z at the point Q, one must draw Parallels which shall give the Abridgement of all the squares, and a like number of all the sides, as in the little Plane. And the more these points of distances are removed from the point of sight, the more the Objects do abridge themselves and close together. And this is it, why all the Beauty of the Perspective dependeth on the points of distances, which ought neither to be too near, nor too far off from the point of sight : the which made me set this third figure, with diversity of removals, for to cause a belief of the verity of that which I am speaking. Let us suppose then that R is the point of sight, and S S the outmost Rays ; if one sets the point of distance at T, he shall divide the Radius S R, at the point V, which shall be the abridgement of the square, whereof S S is one side, the which is ridiculous to see a square which should appear three times more hollow then it ought to be, by reason that the point of the distance T is too near to the point of the sight R, for it must be at the nearest, that the point of distance be as far removed from the point of sight, as the half of the Picture, or of the Perspective, which one would have seen, as is X, removed from R, by reason that these Removals do always give a right Angle to the Eye of the Beholder. In V it would be more pleasing, dividing the square at 2, and at 3, it would be better, dividing it at 4. At 5 it would be far enough removed, and would make the square more short in 6, as we shall give the reason in the figure following.

Some one may say to me, why have I then set in all the Figures of this Book, the points of distances so near, seeing that being removed farther, the whole would have been more pleasing : And he might by reason, if I had made the book only to have bin seen for curiosity : but it being made for to teach, there was need that all should be seen, the better to understand our Orders : this is the cause, that I have put into the works as much as I could. If one answer me, that it were better to make the book longer : I must then have made it much bigger, and have set but one figure in every page : the which I would avoid and make a book, convenient for carriage and it will suffice to advertise that amongst the works that one shall make, he ought to enlarge them : the which is easie, keeping the Rules which we have given.

Horizon   **E**   Line

C   **D**

O   O

1 *Fig.*

O   O

A z z z z z z z z B

A   **B**

Z   Z   Z   Z   Z   Z   Z   Z   Z

L   **K**   **M**

O   O

2 *Fig*

O   O

Q   Q

Q   Q   Q

Q   Q   Q

Q   Q

F   **G**

F   **G**

z   z   z   z   z   z   z

X   **T**   **R**   1

3

V

Y   5

2

3 *Fig*   4

6

S   *S*
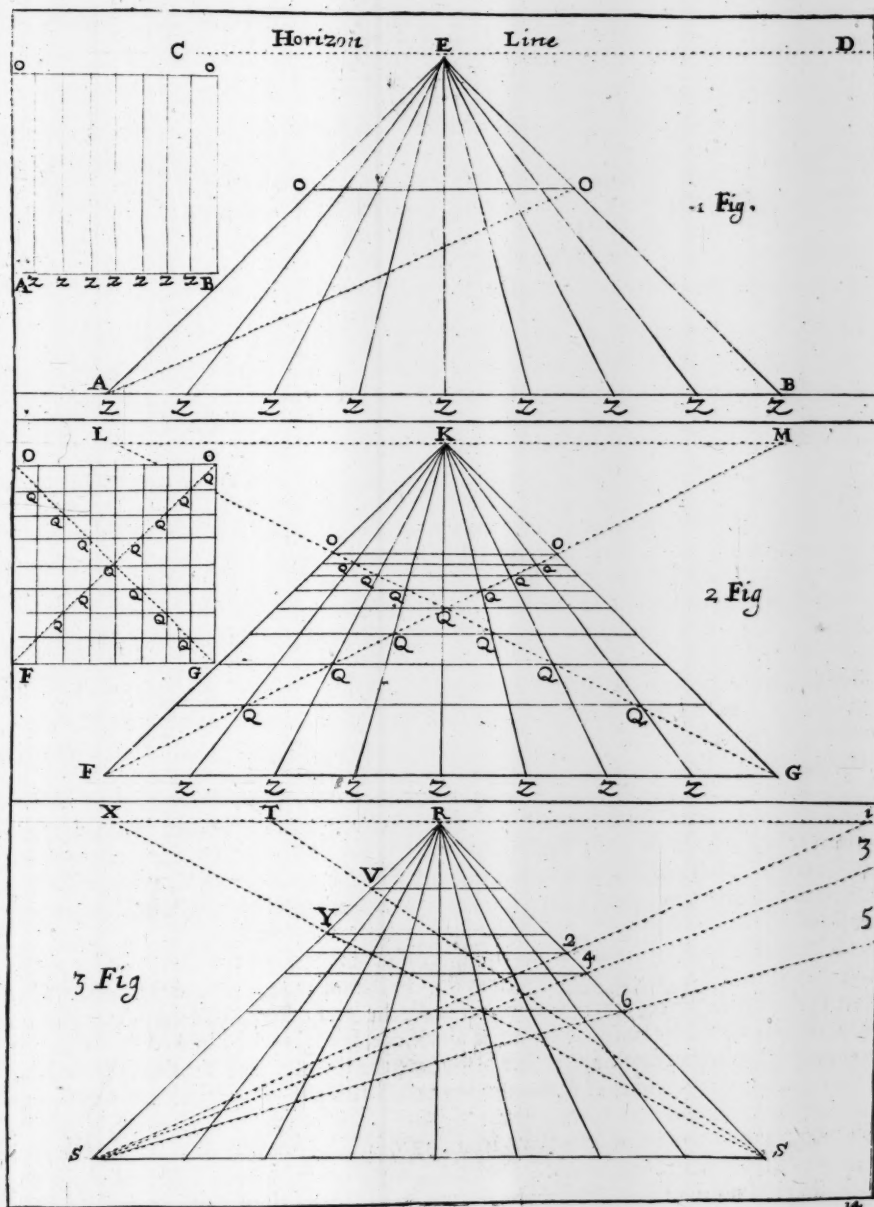
Of the Distance, or Removal and Setting.

WE have said, speaking of far off visual Rayes, that the Eye could not conveniently discover more, then that which may be comprised within one right visual Angle. That is to say, that the sight receiveth not clearly nor entirely the Objects, when the Rayes go beyond the right Angle : And behold the reason, The apple of the eye being near to the center of the eye, cannot receive clearly more then a quarter of a circle, so that the Rayes which are beyond that have but a confused and troubled sight, when the Angle is more then 90 degrees : this is the cause that it is better to make it rather lesser then greater, as it may be of two thirds, which are 60 degrees, but not less : because that the Rayes being so streightned or restrained, would not give Contentment to the Eye, because that the Angles being so little, make as it were but one point between the Apple of the Eye : let us see this difference by figures. Supposing that these Planes and these Squares were the same that are in the last figure. The distance of the point T to R, will give us the distance of T to the Base, where being, it would be necessary that the Angle open it self much more ; for to see the Extremes Y, Y : for if it open but as a right Angle, the Eye shall not be able to see all, as T the right Angle, cannot see but the points V, V, the which would make the Perspective wholly faulty, by reason that that which should give us a square, would frame us a Parallelogramme. The nearest that one can set it is at the point X, which is, as I said even now, the true Measure of the right Angle, which containeth all the Piece Y, Y : If one withdraw it yet further from the point of sight, it will be yet more pleasing, as in I, which hath but an Angle of 72 degrees. But if one withdraw it unto Z it will be the perfection, because that the Rayes being not so much dilated, have the more force, and conteine better the Objects : but I would never goe any farther then 5. for the reason whereof we are speaking ; that the Angles are but as one point within the Eye, and a confusion within the Object. The which ought to oblige us to take good heed, where we set the Points, seeing that they are so important and necessary. And to hold for a general Maxime, that it must be at least, that the distance be equall to the space, which is from the right Radius, unto the Corner of Perspective. For xample ✠ R, is the right Radius and X ✠, the lesser distance which is equall to ✠ Y, whereof having taken the Measure, we must Carry it on the one and other side of the Point sight as here R S S. Or of one side onely, as shall be seen in the Leaf following.

Behold what may be said herein, by the reasons of the Eye, but the Practice giveth this Excellent Rule, which may be Generall, so that one use it with discretion. That having chosen the place, where you would make the Perspective, you may determine on what side it will be the better in sight, and whence it ought to be looked on : and then you must take the measure of this last place unto the former, and set this Interval by a little scale from the point of sight unto the point of distance : provided that it be not too far removed : and it is in this, that the discretion is requisite, that one do not set it too near, and to avoid that which we are speaking of, nor too far off, for fear that we finde no returns where one would have it set : for Objects so far removed from the sight do yield no return. This is why we ought to give but the draught to Buildings far distant, as we shall say hereafter.

❦❦❦❦❦❦❦❦❦❦❦❦❦❦❦❦❦❦❦❦❦❦❦
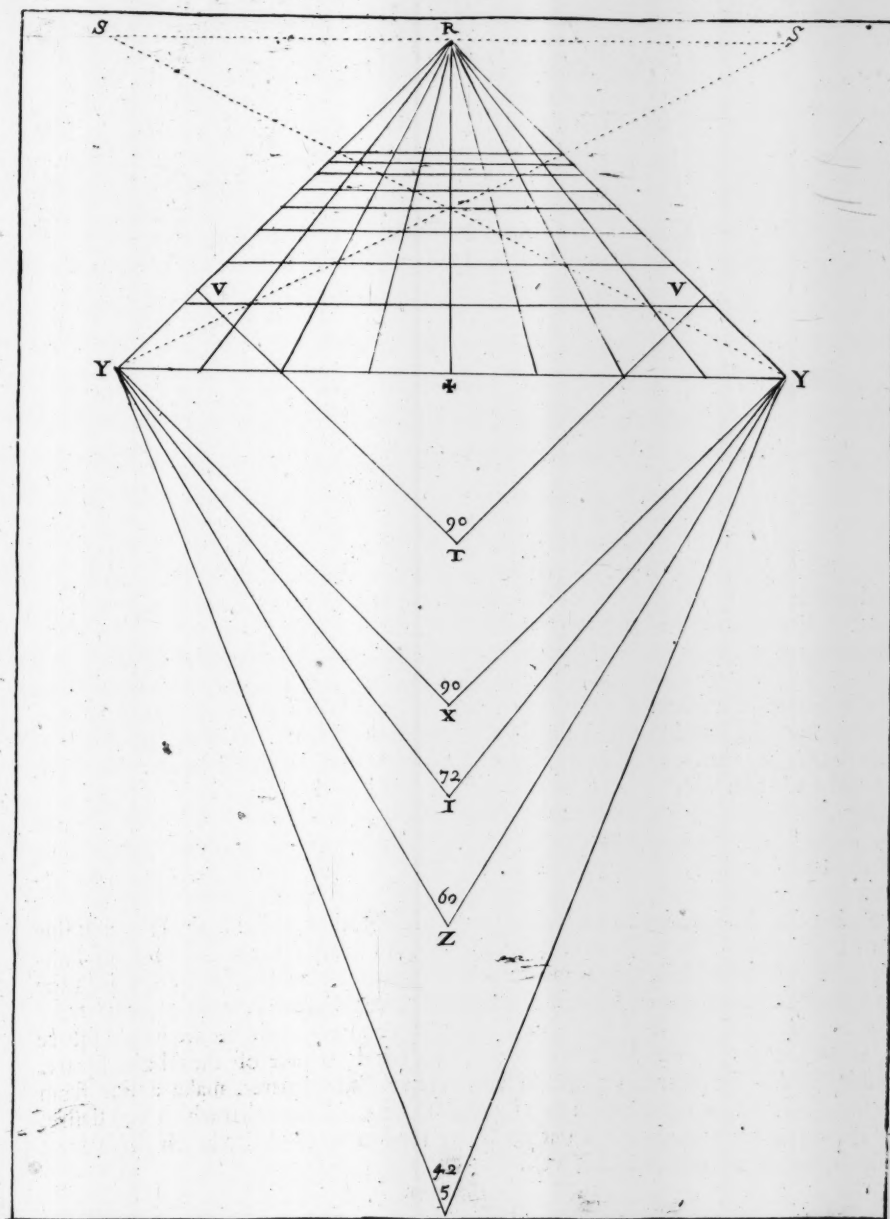
The first Advice about the Point of the side.

T Hey never change the Rules of the Point of the Front for the points of the sides;
for they have all for a principle one & the same cause, which produceth always
the like effects; Wherefore I shall not speak thereof in particular seeing that
the Order of the point of the side, is the same with the Point of the Front as one may
see in the first figure where the Base A B, hath as many, and the same divisions, as the
foregoing. Let the Point of sight be in C, and the point of distance in D, from which
if you draw the line A D, you shall have the sections Q, which give the abridgement of
the squares in the same Number with the other. The rest shalbe known in the Orders
following.

❦❦❦❦❦❦❦❦❦❦❦❦❦❦❦❦❦❦❦❦❦❦❦

The Second Advice of the Hollowing or deepe sinkings.

O Ne may sink or hollow the Perspectives, asmuch as one would, by the Means
of the Base E F, if one draw lines to the points of distances H I; for which
they shall divide the Visuals E G and F G at the point K, it shall be the A-
bridgement of the first square, as we have already said twice or thrice. Now if we
take this line K K for the base, and from the ends K K, we draw lines to the points of the
distances, where they shall divide the same line E G and F G at the point L L, that shall
be the Abridgment of the second square, which shall have as many divisions and squares
as the former; if we shall take further this line L L, and shall make the same Operations,
we shall have the Abridgment of the third square at the point M. And if we shall begin a-
gain further by that, we shall have a fourth, and so we shall go unto a Point: the which
would be a length which would appear infinite; And by this means it is easie to sink
and to abridge the Perspectives: for if you would have the double of its bredth, do as
we tell you; if you would have but the half, draw a line where the lines of the points
of the distances cross themselves, as in N, and you shall have that which you de-
sire.

Seeing that this is so infallible, that as many visual Rayes as divide the Diagonal line
drawn from the points at the distances to the base, so many squares one hath of sink-
ings: we may, as I said, give as many hollowings as we would to the Perspective; for
if in stead of taking from the point of distance O, at the Ray F, you draw it from
the Ray Q. There will want two squares, but that you have abridged the whole square
R, as we see in S, which is that which you have fail'd to take of the whole square.
And if besides the square, you would have yet two little squares, make a line from
the same point O, which divideth two Rays as V, you shall have that which you desire.
If you would have four, take X: if six N. If the square whole Z, the which is a great
easiness, when one understands it well.

1 Fig

2 Fig,

3 Fig

E.
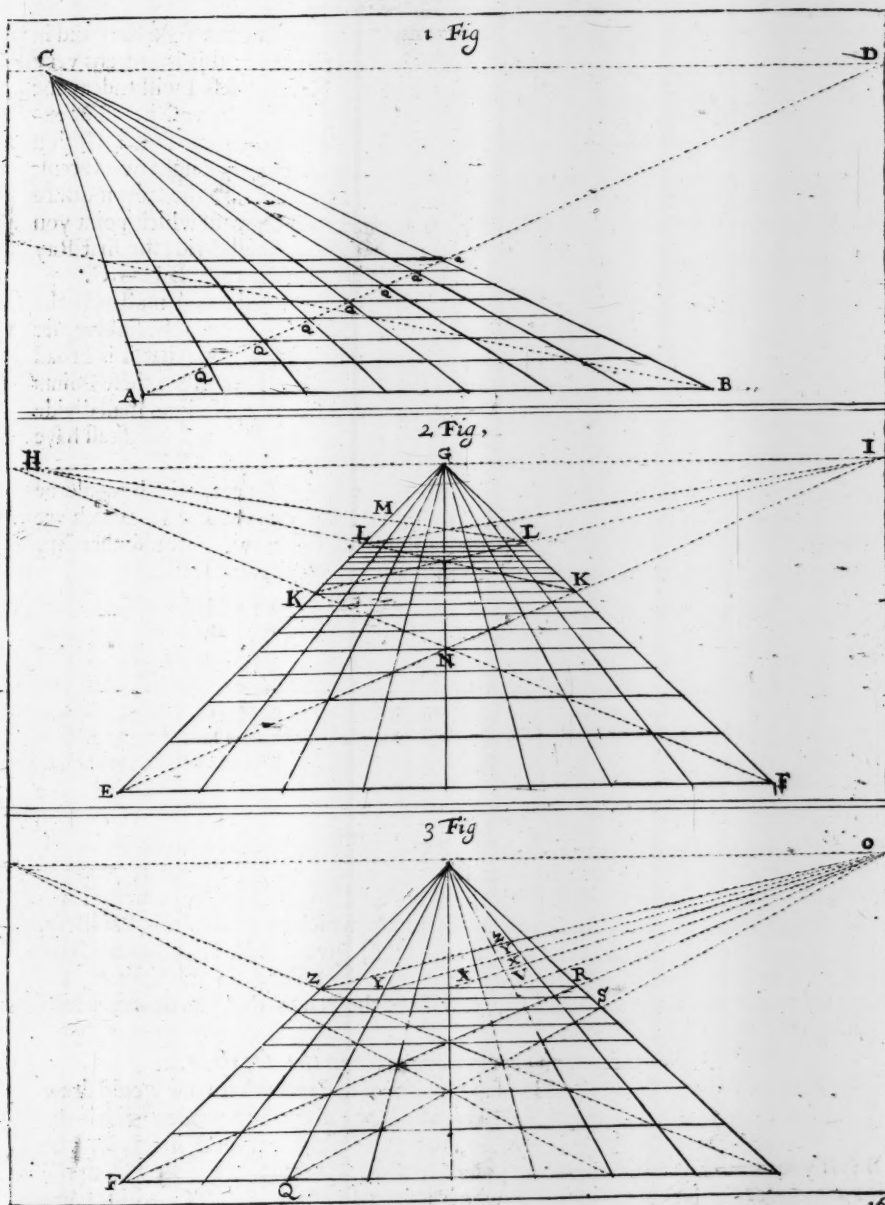
The third Advice of the Meafures upon the Bafe

THE Bafe only may ferve for to give fuch a finking as one would have and in
what place they would, without ufing any little fquares, this is a means very
ready, but it is fomewhat hard to underftand; Neverthelefs I will endeavour
to make it be underftood, the beft that I fhall be able, for we do often ufe it. For ex-
ample, let the Bafe be B S, the point of fight A, the points of diftances D E : If you
would make the Plane of a Cube B C, you muft draw to the points of fight two Occult
lines, or pointed from the ends B C,then for to give it its bredth take the fame meafure
B C, which you fhall tranfport upon the Bafe C F,equal to B C, from which point you
fhall draw a line to the point of diftance D,and where this line fhall divide the firft Ray
C at the point G, this fhallbe the Abridgement of the plane of the Cube B H G C.

If you would have an Object more forward towards the midft, you muft take the
bredth of it and the diftance above the Bafe, as I K. Now for to have the finking, fet
fuch as you would have upon the fame Bafe, as it might be L M, becaufe that it is broad
at that point L, and afmuch for the largenes at the point M. Then from thefe Points
L M, draw an occult line to the point of diftance D, and where thefe lines fhall divide
the Raye K, at the points N O, you muft draw Parallells to the Bafe and you fhall have
the fquare Q P O N.

By this manner, you may tranfport on the other fide the fquare, which would be
above the Bafe, as B H G C, is tranfported to V, and the Points M and T, which are
removed but 2 feet from the point S, do give a figure very narrow, becaufe that they
are very near, and the fame diftance, which they are removed, as we fee X.

The fourth Advice of the Bafe and of one only point of diftance.

SEeing that one may have the bredths and the depths,by the means of this Bafe,one
fhall neede no more to take the Paines to make the little fquares, the which I
would make appear to the fight in this example. Let us fuppofe, that you
would make a Ranke of Pillars, or Trees on each fide : You muft fet upon the Bafe
the place and diftance that you would have, with their bredth or Diameter, as A B C
D E F G. Then placing the Rule upon the point of the diftance O, unto each of
thefe Points A B C D E F G, where it fhall marke the fections upon the vifuall Raye
A H, it fhallbe the Termes of the Objects which you defire. For to tranfport them on
the other fide, upon the Raye G H, Set one leg of the Compafs at the Ocular Point H,
and with the other take the fame without ftirring the leg from the Point H, make an
Arch with the other, where it fhall divide the Raye G H,this fhall be the fame Terme ;
as M is the fame with N. And fo of others, by the which you fhall draw Parallells,
which will give you the bredths. And for the length, give it fuch, as you would have
it, and fet it from A, as it might be P, then draw from the point P, to the point H, and
where it fhall divide the other Parallells, it fhall be the Planes that you defire, which
you may make rounds or fquares.

The fifth Advice,not to deceive ones felf in the Meafures.

YOU muft never fet on the fide of the point of diftance where one would draw
for to give the finking, the Objects which one defireth to produce within the
Plane. Example, The vifuall Ray, upon the which one muft mark, let it be
A B : If you would produce there the point C, and D, it cannot be drawn from the
point of diftance E, but well from that which is oppofite to it F. If C and D, were
within, as G H, it ought to be drawn from the point E : becaufe that the line of the
fection meeteth between both, and not from the point E : and fo both the one, and the
other fhall divide themfelves in the fame point I K.

D   1. A Fig.   E

V

P   O

X

H   G

C   Q   N

B   F   I   K   L   M T   S

O   2. H Fig.

M   N

F

D

C

B

A   P   B   C   D   E   F   G

E   3. A Fig.   F

I

K

C   D   B   G   H
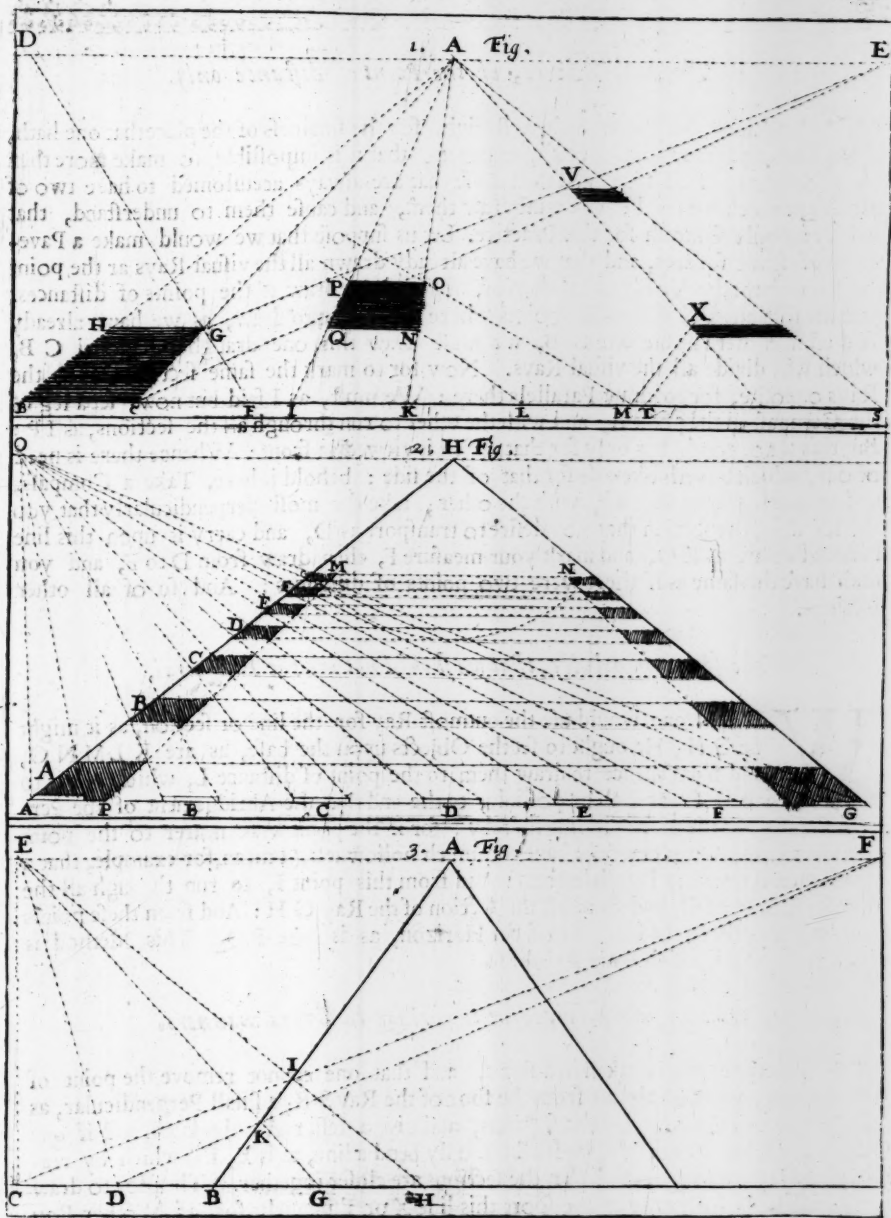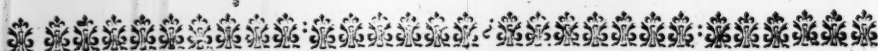
The sixth Advice, of the Point of distance only.

SOmetimes one is at such a streight for the smalness of the place that one hath, be it against a wall, or cloth, or paper ; that it is impossible to make more then one point of distance, and then those that are always accustomed to have two of them are much troubled : We must draw them, and cause them to understand, that one Point only sufficeth for this Practice. Let us suppose that we would make a Pavement of small squares, and that we have already drawn all the visual Rays at the point A, for to have the Abridgement thereof, we ought to draw at the points of distances, and the sections will give us the points where we ought to draw, as we have already said : but if there be but one as B, we must draw this one draught Diagonal C B, which will divide all the visual Rays. Now for to mark the same sections upon the Rays opposite, for to draw Parallels there : We must, as I said but now, set a leg of the Compass at the point A, and with the other to run through all the sections, as I P : But this is not good, but only for that which is viewed in front : Whence there is need of one, which serveth likewise for that of the side : behold it here, Take a Compass, and set one leg upon the base, with the other ; take the most perpendicularly that you shall be able, the section that you desire to transport as D, and carry it upon this line Perpendicular, as E O, and mark your measure F, then draw from D to F, and you shall have the same as if there were two points of distances : And so of all other sections.

The seventh Advice, that we should not use the Diagonal.

WHEN one would use the outmost Ray for the line or section, as it might be G H ; He ought to set the Objects upon the base, as are K L M N O, and from thence to draw them to the point of distance L, which ought to be drawn back as far as shall be possible, to the end that the Abridgement of the Perspective, may be the more pleasing thereby : for if the point were nearer to the point of sight G, the Objects would have too much hollowness, (I mean, for example, that a square would appear a Parallelogram) And from this point I, to run through all the Objects K L M N O, and to mark the section of the Ray G H : And from these points to draw Parallels to the base, or of the Horizon, as is here P Q. This Method is the least in use, although some do take it.

The Eighth Advice, for to abridge in divers manners.

IF sometimes one be taken in a strait, and that one cannot remove the point of distance, we must elevate from the foot of the Ray S R, a small Perpendicular, as T S, which shall receive the sections, and give a lesser Abridgement ; and if one would have it yet more little, he shall but only bend a line, as is X, the which by reason of its inclination, causeth that the sections are closer together. Then for to draw the Parallels, he hath only to transport this line X or T, upon the foot of the other Ray as is V, and from all these points to draw lines Parallels to the base, and you shall have that which you desire.

1. Fig

A
E
I P
F
D
C O

2. Fig

I
G
P Q
K L M N O H

3. Fig

R
V
T
X
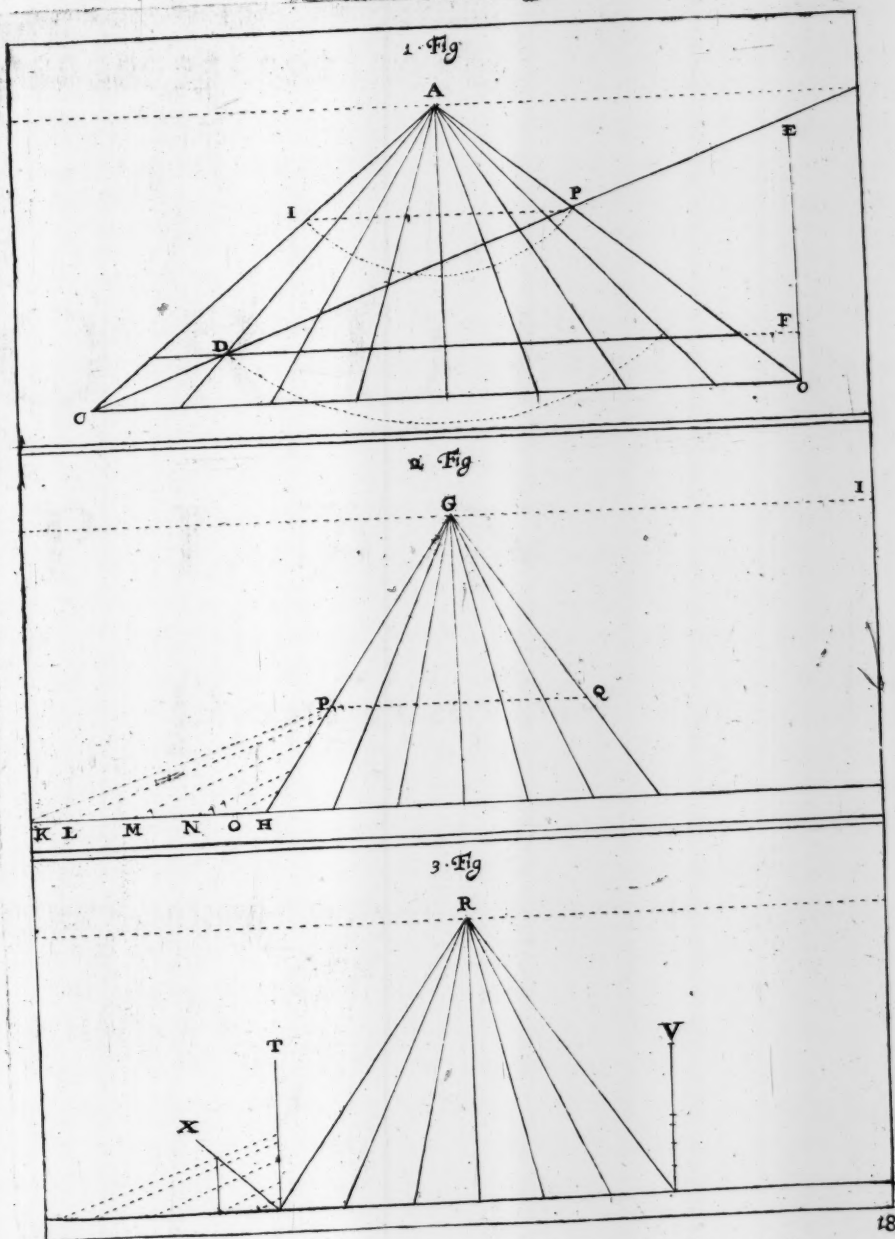
THE
ORDERS
FOR
PLANES
IN
Perspective.
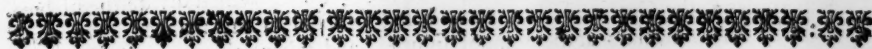
Of Planes viewed directly or in front.

ONE may have seen at the third and fourth Advice, and the Elevations following will cause to know, that it is not my purpose that one should use Planes Geometrical, for to make Perspectives : for this would be to double the labour ; and no Painter would take this pains, seeing that I teach him to make the same thing by means of the base. But as there is no Rule so general, which hath not its exception; so there are certain Figures, which one cannot set into Perspective, but by the help of these Planes : further also one should be troubled, if one should give one of these Planes to be set into Perspective, and that one had not learned how he ought to proceed. These Reasons have obliged me to set these which follow, the which will suffice to learn to set into Perspective all those, which may be presented and also be imagined.

1. To contract or abridge a square A B C D. One must draw A B at the point of sight E, and from the same Angles A B, two Diagonals, F B, A G, and where they shall divide the Rays A E and B E, at the points H and I. This shall be the square A B C D, abridged into A H I B; for to make it without the Geometrical Plane, we must draw from B to F, or from A to G, or else transport A B upon the base, as B K, and from the point K to draw to the point F, it will give the same section I upon the Ray B E.

2. To abridge a square viewed by the Angle D, having made the Plane A B C D. We must draw a line which toucheth the Angle B, and it must be in right Angle upon the line B D. This base being produced, we must set the Rule upon the sides of the square, as A D, and D C, and where this Rule shall divide the base, there to make the points H I, then to draw H and B, to the points of distances P and B I, to the other point of distance G. And at the section of these lines to make the points which shall give you the square K L M B ; for to make it without the Plane, you must set the Diameter on the one part, and the other of the middle B, as H and I. But as well in the one manner as the other, you must not draw at the point of sight O.

3. To abridge a Circle. It must be enclosed in a square A B C D : And from the Angles A D and G B, to draw Diagonals, which shall divide the Circle into eight parts ; and where they shall divide it at the point O, to draw upon the base the Perpendiculars E F, then to draw two lines Diametral Q R S P, which divide themselves in right Angles at the Center G. The Plane being ordered in this manner, you must draw all the Perpendiculars at the point of sight H, and where they are divided, the Diagonals A K, and B I, to make points; of the which the two latter M N, are the draughts of the square, which are to be divided into four by the section of the Diagonals, at the point P. Then from the ends of this Cross they draw bended lines by these points, which give the shape of a Circle in Perspective. This manner may pass for little ones : but we shall give one more exact for the greater.

4. This Figure is composed of the two first, wherefore I will say nothing of it ; for he that shall have made one or two of them, shall be able to make it easily.

5. The fifth depends also upon the two first : but there is also more a Border round about, which they have not ; for to set this Border into Perspective, we must draw these four Rays A B C D, at the point of sight G, and where the inward Rays B and C are divided by the Diagonals A F and D E, we must draw Parallels to the base, and you shall have that which you demand.

6. It is the same with the second, except that it is compassed about with two Borders: wherefore I will speak no more of it.

1

F   E   G

H   I

A   B

D   C

2

O   P

L

M   K

K   I

B

C   A

D

3

K   H   I

N   P

B   o   S   o   A

R   G   Q

   o   o

D   F   T   E   C

5

F   G   E

D   C   B   A

6
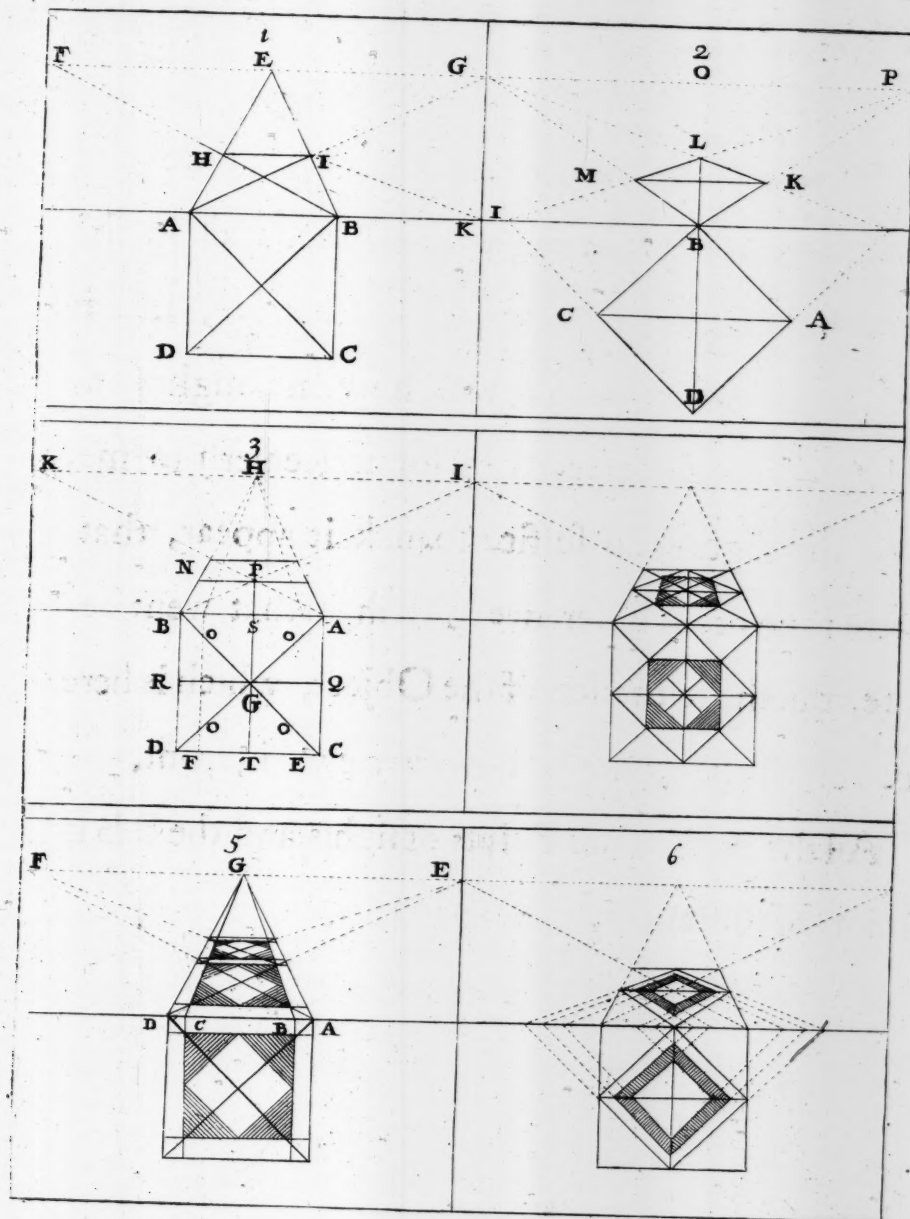
Planes viewed Obliquely or on the side.

T HESE Planes being thofe, that we will
foone difpatch ought to be made all in the
fame manner; which maketh me believe, that it
would be lofs of time to repeat, how one ought to a-
bridge them in Perfpective; for it feemeth to me,
that the Figures do fuffice to make it appear, that
there is no other difference from them that went be-
fore, but the fcituation of the Object, which is here
feen on the fide, and the other is view'd in front,

All the **A A A** are Points of fights; and the **B B B**
points of diftances,
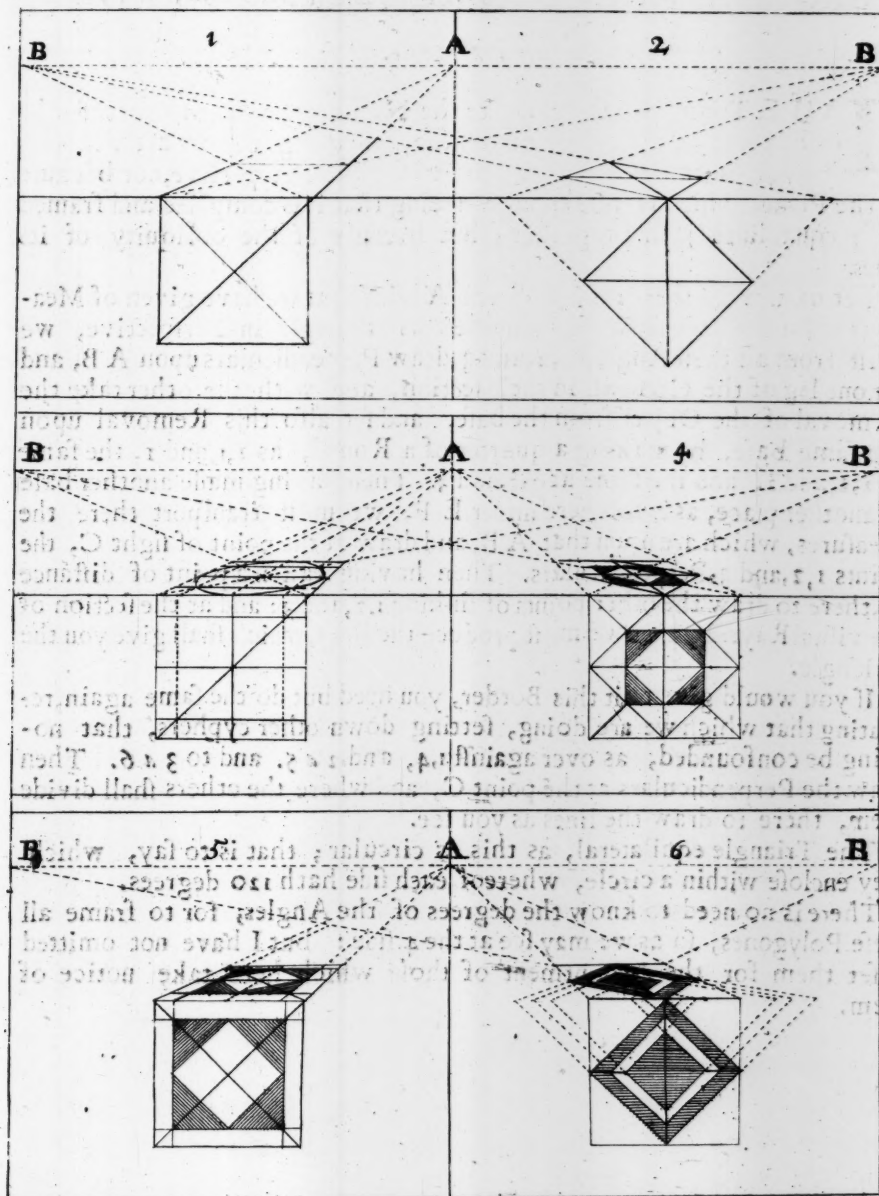
Of a Triangle.

THE Triangles, according to the Numbers, ought to precede the squares: but according to reason, they ought to go after in this work, because they are harder to set into Perspective, not because of the Plane, which is easie enough, seeing that it is composed and framed of 3 equal lines joyn'd together; but because of the obliquity of its sides.

Let us now see the Practice of the Advice that we have given of Measures upon the base A B, for to make this Triangle in Perspective, we must from all these Angles 1, 2, and 3, draw Perpendiculars upon A B, and set one leg of the Compass in their section, and with the other take the Removal of the Object from the base, and set also this Removal upon the same base, by making a quarter of a Round, as 1, 1, and 1, the same at 2, 2, and 2, and the same at 3, 3, and 3. Then having made another base in another place, as is this here under E F, we must transport there the Measures, which are upon that A B, and draw at the point of sight C, the points 1, 2, and 3, Perpendiculars. Then having taken a point of distance D, there to draw the other points of sinking 1, 2, and 3: and at the section of the visual Rays: by this we must produce the lines, which shall give you the Triangle.

If you would give to it this Border, you need but do the same again, repeating that which we are doing, setting down other cyphers, that nothing be confounded, as over against 1, 4, and 2 a 5. and to 3 a 6. Then draw the Perpendiculars at the point C, and where the others shall divide them, there to draw the lines as you see.

The Triangle equilateral, as this is circular; that is to say, which they enclose within a circle, whereof each side hath 120 degrees.

There is no need to know the degrees of the Angles, for to frame all these Polygones, so as we may see at the 4. side: but I have not omitted to set them for the contentment of those which here take notice of them.

1. **Fig.**

2 **Fig.**
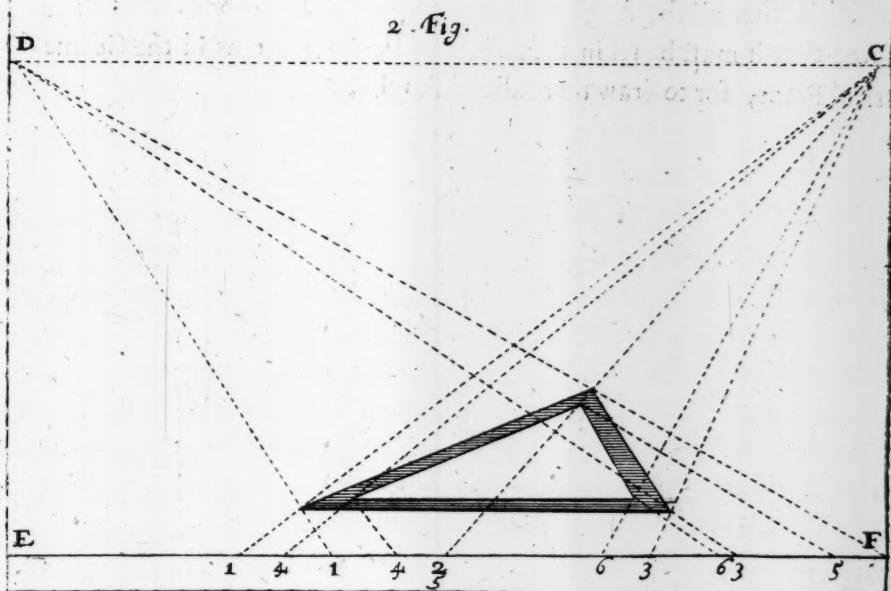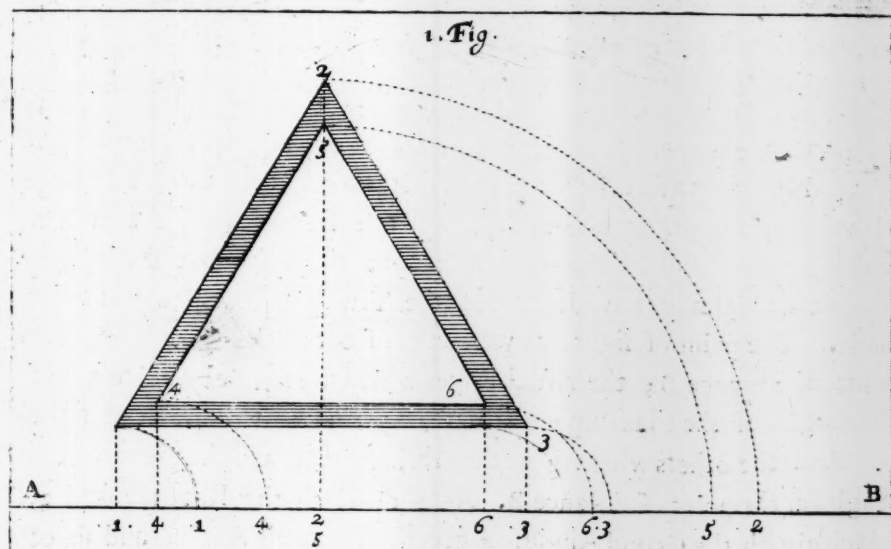
Of the Pentagone or five-Angles.

THE Order of framing a Pentagone is, that we must make a Circle, and divide it into 5 equal Parts, of 72 degrees on each side. Now for to set it in Perspective, it is altogether the same thing with the Triangles, as one may see by this figure, except that it is with a Border; and I have marked it upon the base: but single, by reason that one may have learned by the Triangle, how it ought to be made. The point of sight, as well on the front as the side, is A, the point of distance B; the visual Rayes which are the Perpendiculars of the Angles of the Plane upon the base, are drawn at the point of sight A. And the others which give the Abridgement, and the place of the Angles at the point of distance B. As 1 divideth the Ray marked 2, which giveth the second Angle, 4 giveth the fourth Angle, and so of others. All the rest is clear enough, we must take heed of one thing, which is, that all the Angles ought to draw to the center 6. It is therefore, that it must be set in the Planes in Perspective, as in the Geometrical Plane, for to draw there all the Angles.

1. Fig.

2. Fig.

3. Fig.
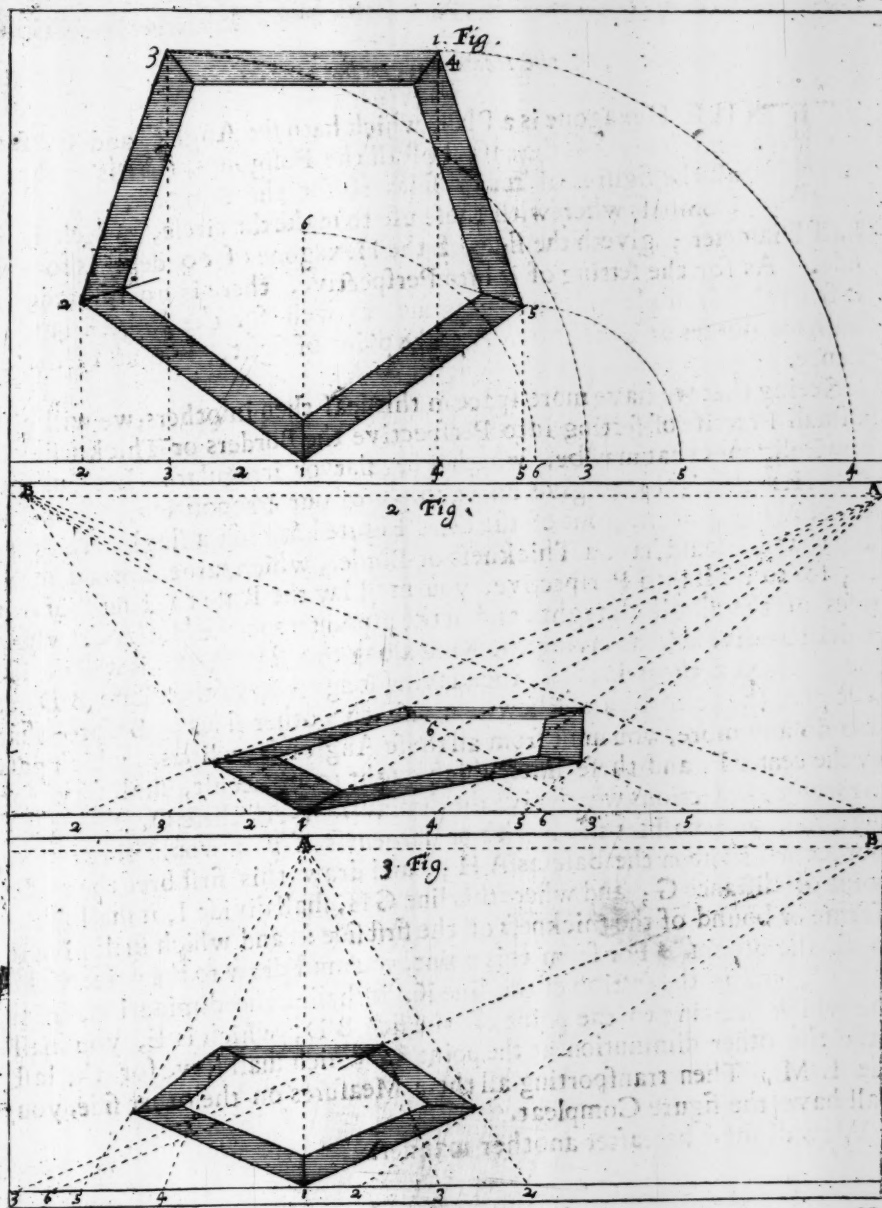
Of the Hexagone, or six Angles.

THE Hexagone is a Plane which hath six Angles, and six faces or sides. It is the easiest of all the Poligones, that is to say, of all the figures of many sides : for the same opening of the Compass wherewith these use to make the circle, which is its half Diameter ; giveth the sides of the Hexagone of 60 degrees for each side. As for the setting of it into Perspective, there is no difference in it from the Triangle and the Pentagone, as well for the single Plane as with the Border or Thickness. A is the point of sight, B that of the distance.

Seeing that we have more space in this leaf then in others, we will give a small Practise of setting into Perspective the Borders or Thicknesses of any Poligones that may be, whether regular or irregular: Let us use this Hexagone ; for to give an example of our Proposition, supposing that the Plane of the front of the third Figure hath but a single draught ; and that it should have a Thickness or Border, which turneth round about it ; for to set it into Perspective, you must lay the Rule the length of the sides of the single draught, and make a point upon the Horizon, where it shall be divided, as laying the Rule along the side A B, it will divide the Horizon at the point C ; then laying it again upon the Plane B D, it will give the point E, and likewise of all the other sides. Before that you do any more, you must from all these Angles draw lines, which pass by the center F, and these lines which ought to be occult, shall serve for to receive the sections which give the diminution. All these Orderings being done, you must set the bredth or largeness if you would give to the Border or List upon the base as A H ; and draw this first bredth at the point of distance G ; and where this line G H, shall divide I, it shallbe the Terme or bound of the thickness of the first side : and which shall give it to all the others. For from this point, you must draw to the point of the side C, and at the section of the line K, it shallbe the diminution, from the which drawing to the point of the side B D, which is E, you shall have the other diminution at the point L, which shall serve for the last side L M. Then transporting all these Measures on the other side, you shall have the figure Compleat.

We will shew hereafter another manner.

1 Fig

3   4

2   5

2 3 4   2   6 4   5 3   5   4

2 Fig

3   4

2

2 3 4   2   6 4   5   3   5   4

E   3 Fig   C   G

D

M L
K   F   E

L
H A
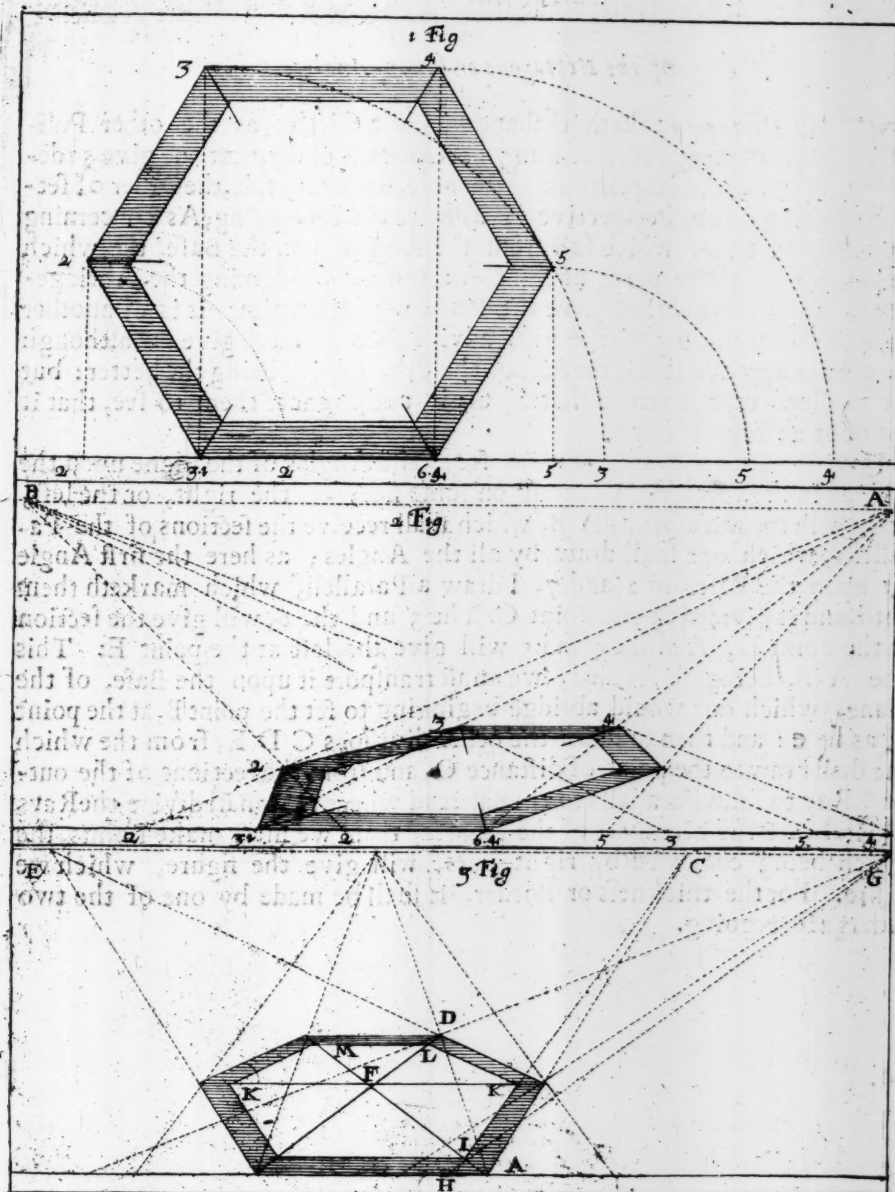
Of the Heptagone or seven-Angles.

THe *Heptagone* taketh its shape within a Circle, as the other Poligon, s. They divide it into 7 parts: that is to say, that one give 51 degrees, 25 Minutes and a little more, for every side, the Order of setting it into Perspective, is alike to the fore-going; As concerning the Perpendiculars, which fall from the Angles upon the Base, the which are drawn all at the point of sight A: But as Concerning the Abridgement, and the lines that give the Place of the Angles, it is of another manner and according to the 7th. advice that we have given: although we do not approve it the practise of the 8th. advice being the better: but for to Condescend to those that do use it, and to cause them to see, that it doth not abridge enough.

Having drawn Perpendiculars from the Angles of the Plane upon the Base as in the former; We must on some side, on the right, or the left, make a Perpendicular, as A B, which shall receive the sections of the Parallells, which one shall draw by all the Angles; as here the first Angle set upon the Base, of 2 and 7, I draw a Parallell, which marketh them both, and is divided at the Point C. The 3 and the 6, will give the section at the point D. And the 4 and 5 will give the last at the point E: This line A B, being so divided, we must transport it upon the Base, of the Plane, which one would abridge beginning to set the point B, at the point F, as he 6: and then to mark the other divisions C D E, from the which one shall draw to the point of distance O, and from the sections of the outmost Ray to draw Parallells to the Base: and where they shall divide the Rays which beare the Numbers of the Angles, there we must make Points, the which being conjoyn'd by right lines, will give the figure, which we desire. For the thickness or Border, it shall be made by one of the two orders afore-going.

1 Fig.

2. Fig.

Gij.
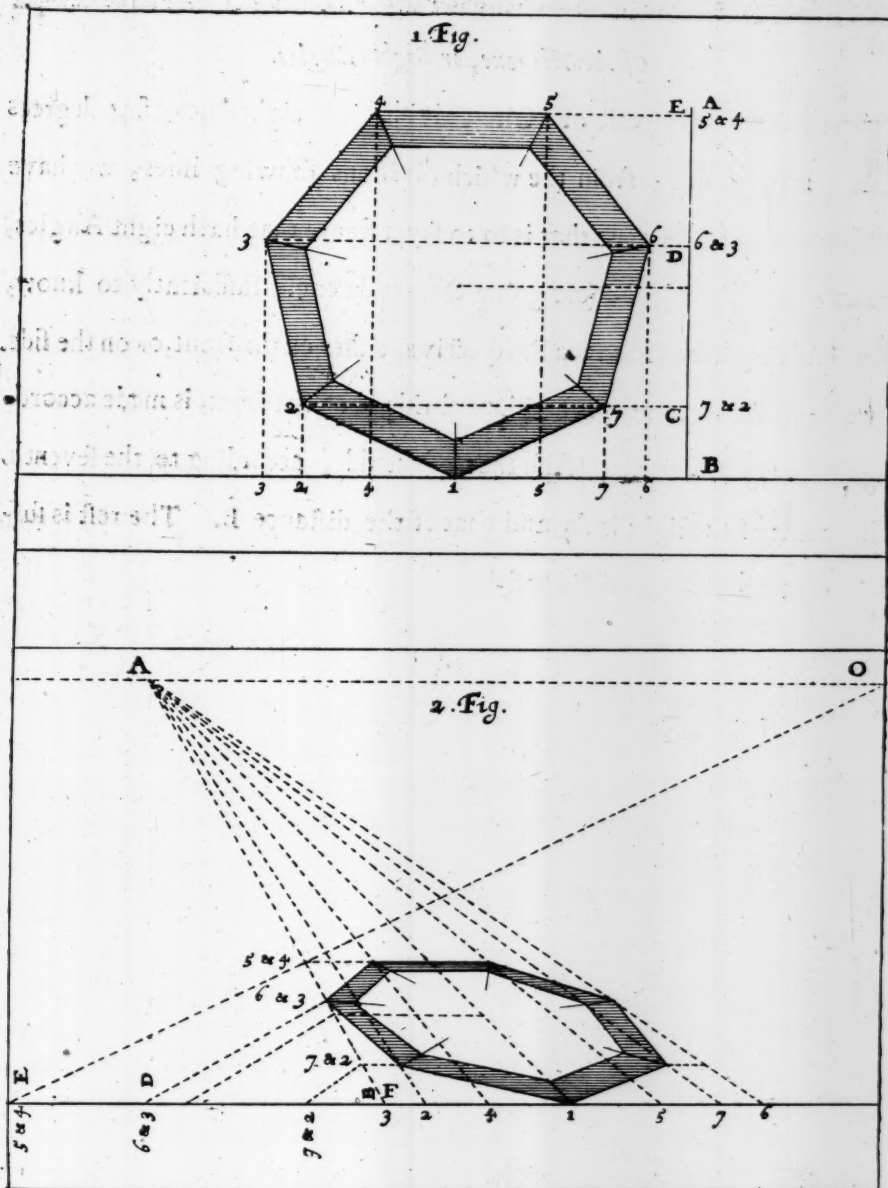
Of the Octogone, or Eight-Angles.

THe *Octogone* is made of a Circle divided into eight Parts, of 45 degrees
for each side; from the which divisions drawing lines, we have
the shape of the Octogone that is to to say a figure that hath eight Angles,
and as many sides.   The fore going Orders do cause sufficiently to know,
how one ought to set it into Perspective, either on the front, or on the side.
I will only Advertize that the Plane abridged on the front, is made accord-
ing to the eighth advice; And that of the side, according to the seventh.
The point of the sight is A, and that of the distance B. The rest is suf-
ficiently seen without an Exposition.
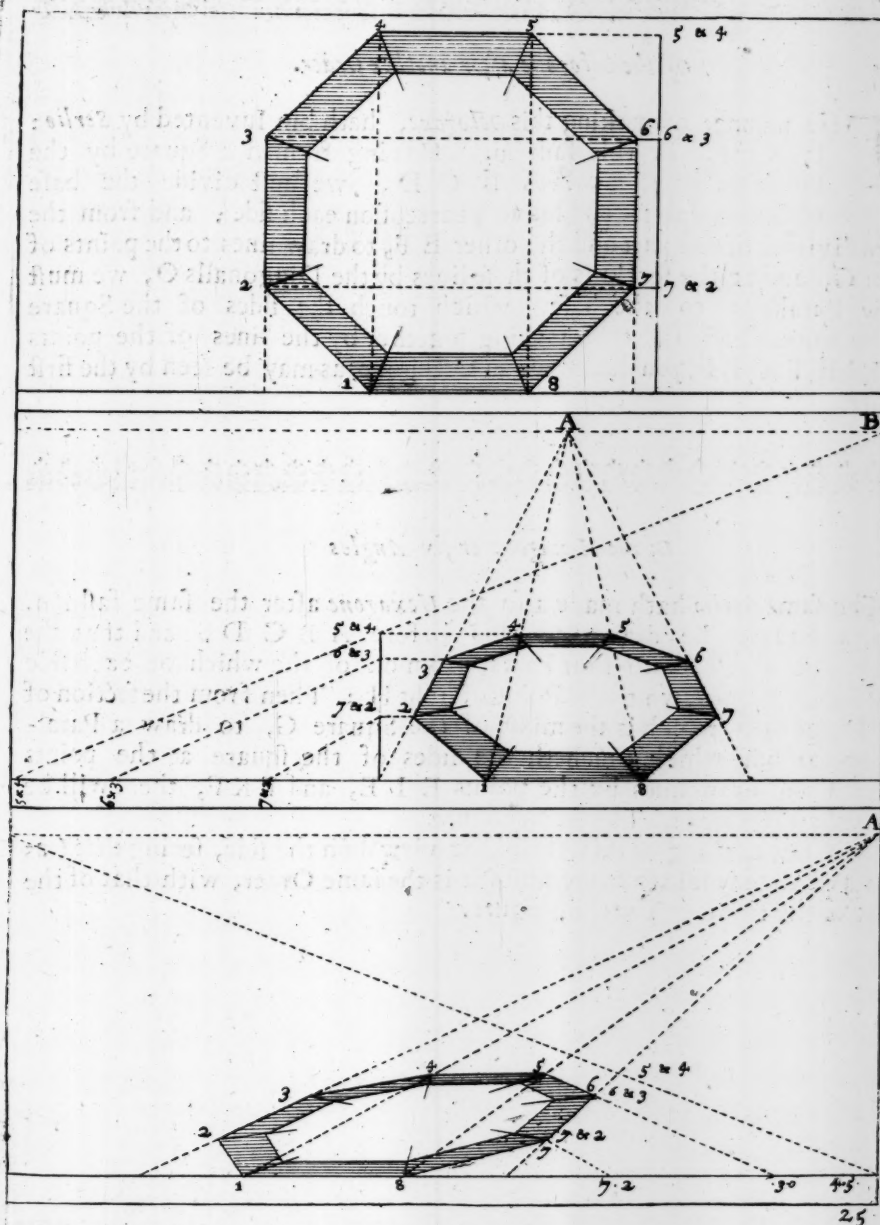
Of the Octogone after another Order.

THe manner of making this *Octogone*, hath bin Invented by *Serlio*: It is made in this fashion. Having framed a Square by the Ordinary way, as is A B C D, we muſt divide the baſe C D in ten parts, and leave 3 thereof on each ſide; and from the third diviſion of one part and the other E F, to draw lines to the points of ſight G, and at the ſections of theſe lines by the Diagonalls O, we muſt draw Parallells to the baſe, which touch the ſides of the Square at the points H I K L, then joyning together by the lines of the points E H, I E, F K, L F, you ſhall have an Octogone, as may be ſeen by the firſt figure.

Of the Hexagone or ſix-Angles

The ſame *Serlio* hath made alſo the *Hexagone* after the ſame faſhion. Let a Square be drawn as this before A B C D, and that the A D, be divided into four Parts, from one of the which on each ſide E F, let lines be drawn to the Point of ſight H : Then from the ſection of the Diagonalls, which is the midſt of the Square G, to draw a Parallell to the baſe which toucheth the ſides of the ſquare at the points I K. Then draw lines by the points E I E, and F K F, there will be framed an *Hexagone*. The ſecond figure.

I will ſay nothing of this Octogone view'd on the ſide, ſeeing that (as we have already ſaid ſo many times) it is the ſame Order, with that of the ſight of the front. The third figure.

Fig.

2.Fig.

3.Fig.
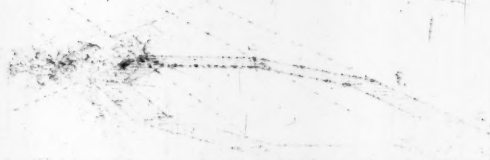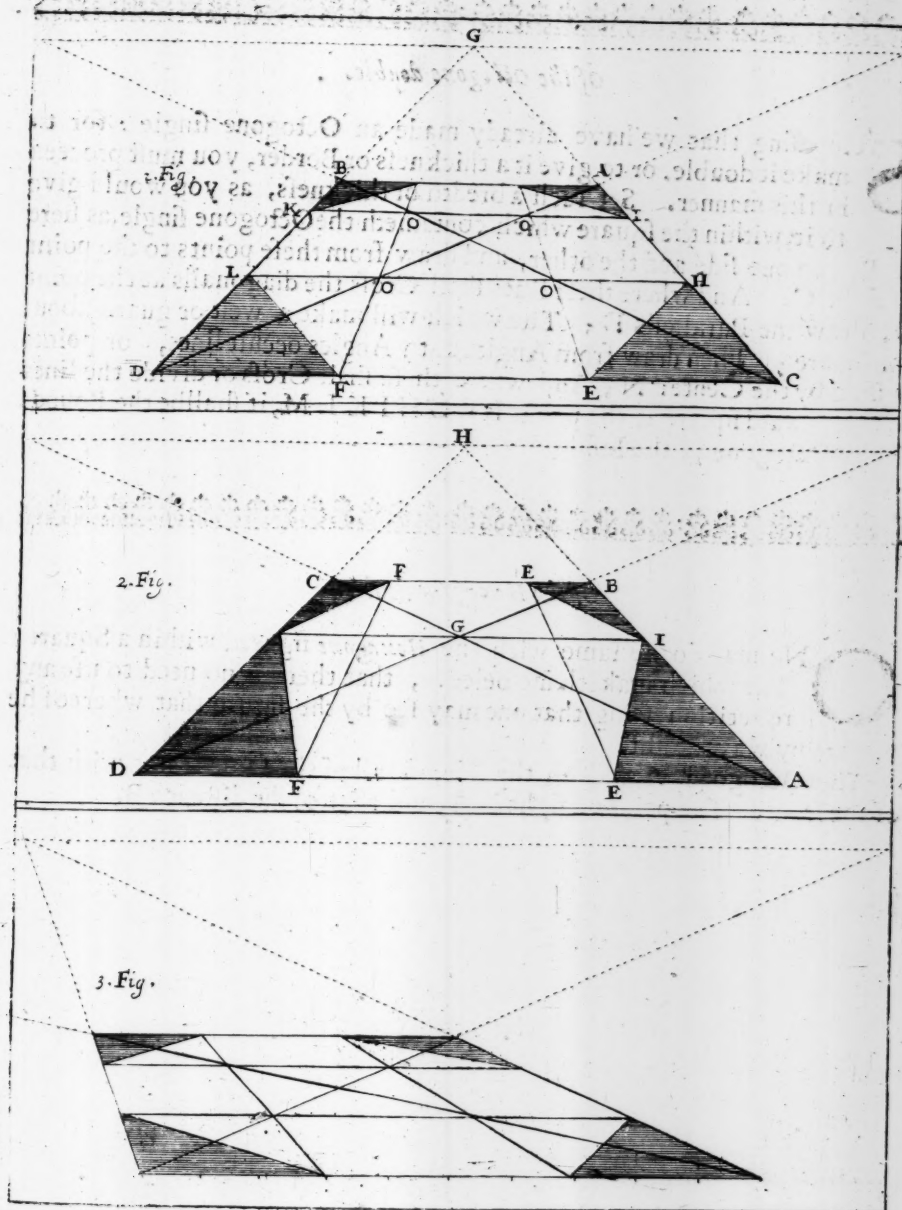
Of the Octogone double.

SUpposing that we have already made an Octogone single : for to make it double, or to give it a thicknes or Border, you must proceed in this manner. Set such a bredth or thicknes, as you would give to it, within the square which containeth the Octogone single, as here A B, on one side and the other, and draw from these points to the point of sight C. And where these lines shall Cros the diagonalls at the point O, draw the Parallells D; The which will make a welt or guard about the square ; Then draw from Angles unto Angles occult lines, or points passing by the Center N ; And where these shall Cros or divide the lines of this inward square at the points E F G H I K L M, it shallbe the Bounds of the Octogone of the Inside.

Of the Hexagone double.

ONe may do the same with the *Hexagone* figured within a Square : The which maketh me beleeve, that there is no need to use any repetition seing that one may see by the figure that whereof he might any ways doubt.

The Octogone view'd on the side, is all of the same frame with that of the front, The point of sight is A, and that of the distance B.

1 Fig

2 Fig

3 Fig
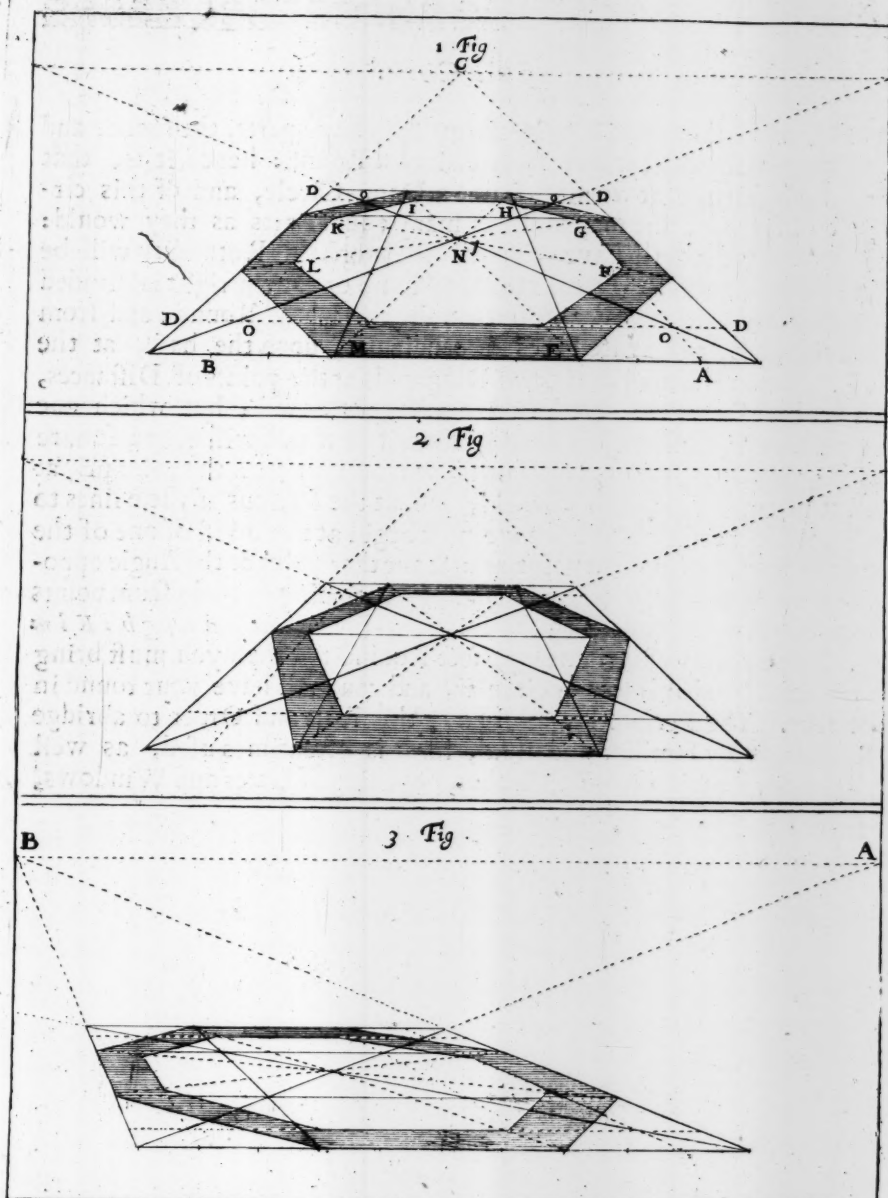
of the Circle.

THe more that any Circular forme shall have parts, the sooner and
more easily shall it be converted into a Round : hence it is, that
Serlio saith, that we must frame a Demi-Circle, and of this cir-
cumference, one may make as many equal Parts as they would:
for the more that it shall have of them, the more this Rotundity will be
perfect: for example, the Demi-circle, a Plomb or Down-right is divided
into eight Parts, which will give sixteen for the whole Round : and from
these divisions Z, to elevate Lines Perpendicular, upon the base, at the
point E.   Then we must draw two Diagonals at the points of Distances,
which are here farther removed then the Plate is broad ; but which one
ought to suppose within the horizon ordinarily ; which will give a square
A H I B; now the square being framed, we must draw all the points E, at
the point of sight F, unto the line H I, and at the sections of these lines to
draw Parallels throughout. Then we must begin at the midst of one of the
sides of the square, to make a point, as *a*, & another point at the Angle oppo-
site, as if one would draw a Diagonal, as *b*, continuing so to do from points
of Angles to Angles, following the Diagonal lines, as *a b c d E f g h i K l m
n o p q*. These points will frame a perfect Rotundity : then you must bring
with the hand bended lines, or circular, and you shall have your round in
Perspective.   The Perspective must have this Rule and Order to abridge
the Rounds, very familiar and usual, for it is oftentimes used, as well
for Columns, bending Roofs, Arches, opening of Gates and Windows,
as for many other Rotundities.

F

I m n o H

l f

k

D B A c
E E E E E E E E E

z z

z z

z z

z

-28

Hij.
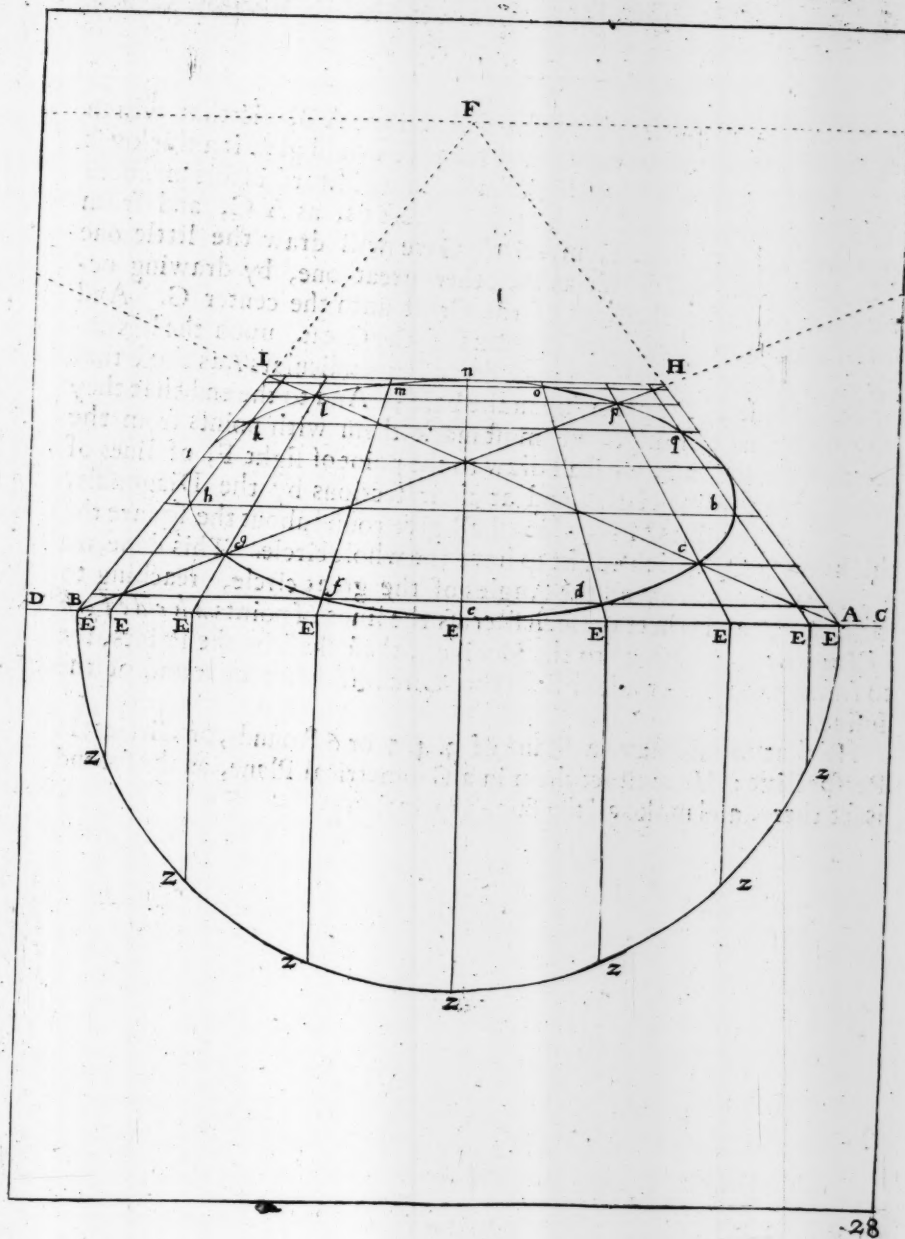
Of the Circle double.

WE muſt ſuppoſe that the firſt Circle A B, is that which we are now to make, and that we would give it a thickneſs or border, by making another more inward, in this manner: We ſhall give it ſuch a bredth as ſhall pleaſe us, as A C, and from the center of the great Demy-circle G we will draw the little one C D, which we will divide as the other great one, by drawing occult lines from the diviſions of the Great unto the center G. And at the ſection of theſe lines of points of the Great, upon the leſs demi-circle at the Points I, we muſt draw Perpendiculars I, as thoſe that we have made in the great, upon the baſe; And to the end, that they may confound nothing, we muſt mark them with points from the points I, of the baſe, we ſhall draw to the point of ſight F, of lines of points unto the line H K, and at their ſections by the Diagonals, draw lines of points M N, which ſhall give round about the ſquare the thickneſs G Q, which ought to have the whole circle. This done, we muſt draw lines from all the Angles of the great circle, reaching to the center, and where theſe ſhall croſs the lines of points *a b c d e f g h i k l m n o p q*, which go to the Horizon, theſe ſhall be the Points, for to frame with the crooked lines the Circumference or round of the Inſide.

He that would have a Plane of 3. 4. 5 or 6 Rounds, or Circles, in Perſpective: He muſt ſet them in a Geometrical Plane, as the ſecond is ſet there, and make all the ſame Operations.
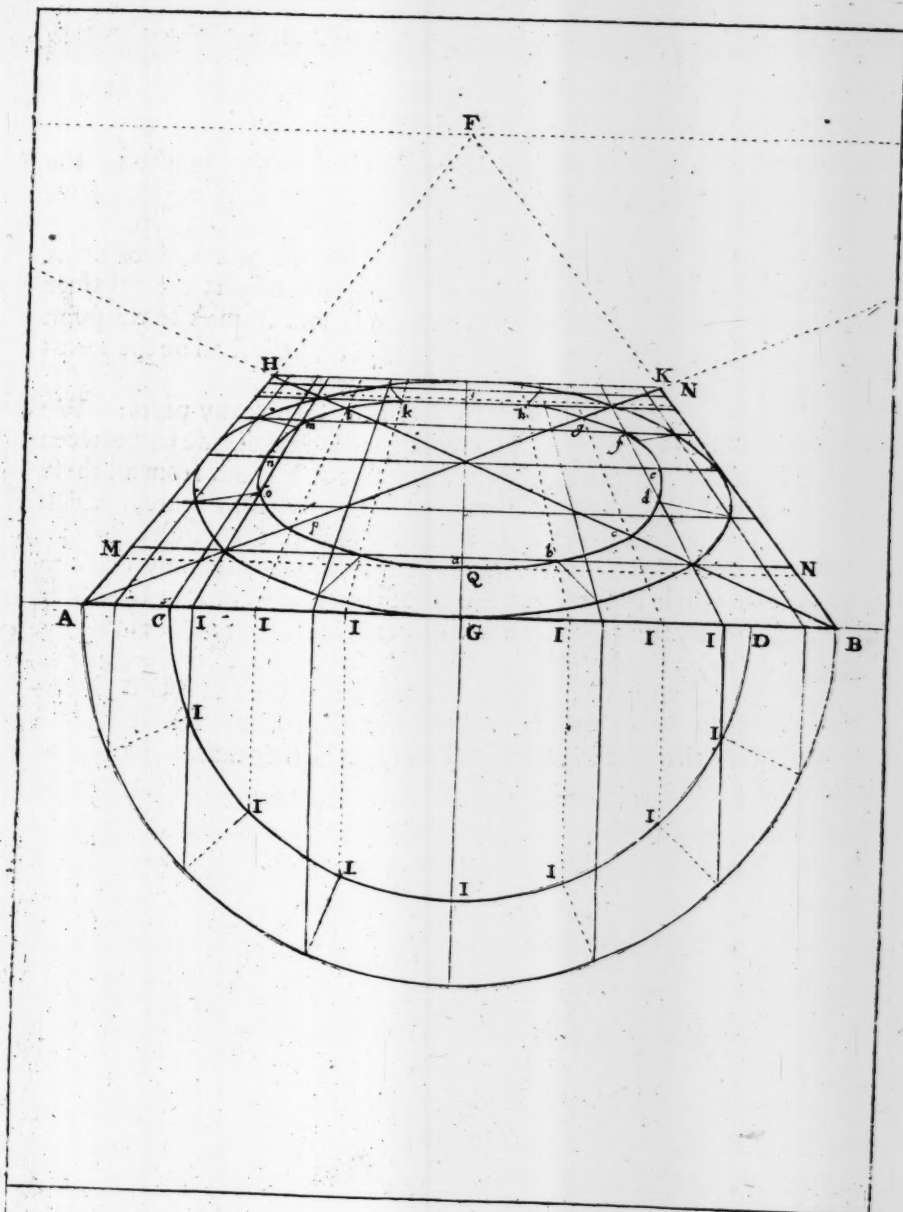
Hiij.

A Plane of the Square view'd from the Angle.

HE that would make a square by an Angle directly opposite to the
Eye, he hath nothing to do but to follow the Order, which we
have already spoken of, which is to double the Diameter A B,
upon the base as is A C, and from the point A and C, to draw
two lines at the point of distance D : then to transport the measure
A C, upon the base in A E, and to draw from E, and from A to the point
of distance F, at the sections of these lines H I K. These shall be the terms
or Bounds of the square A I H K, which one desireth.

When one would divide a Plane of this form into many parts: We
must set the number of the Parts, into which one would divide it, between
the points C and A, and as much on the other side A E; and from all these
points to draw to the points of distances, as we see by this Figure, which
hath eight little squares on each side, and sixty four in the whole.

If upon the same Plane, seen from the Angle, one would only cause to
be seen four other little Planes, at the ends of the Angles, as four Bodies of
a Building, columns, trees, or any other object whatsoever: We must set
the bredth of it upon the base within the length of a Pane, or sides of the
square A B, or A C, which have D and E between A B; and F G between
A C, from which points drawing to the points of distances H and I, their
sections shall give the four Planes K L M N, which is that which is de-
manded.
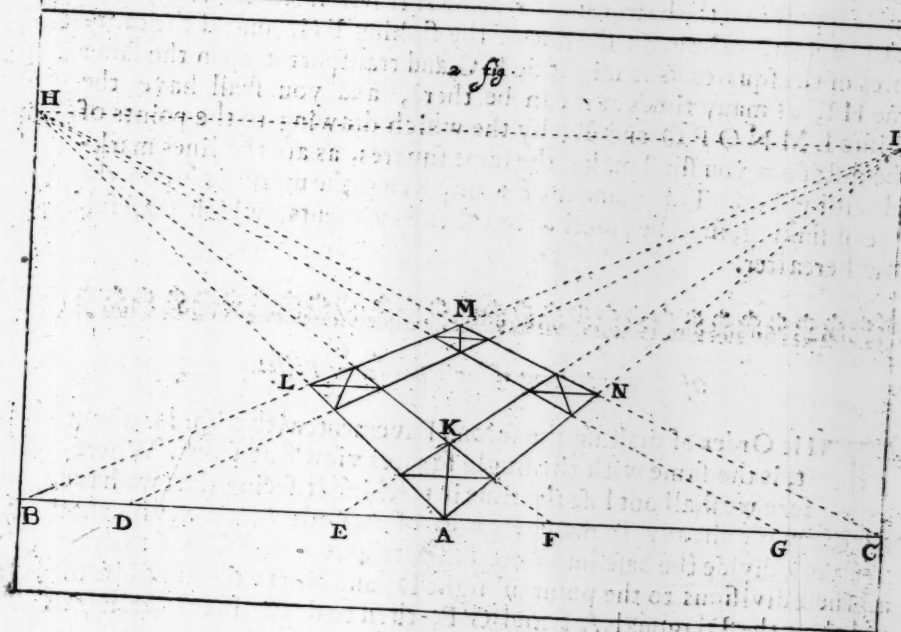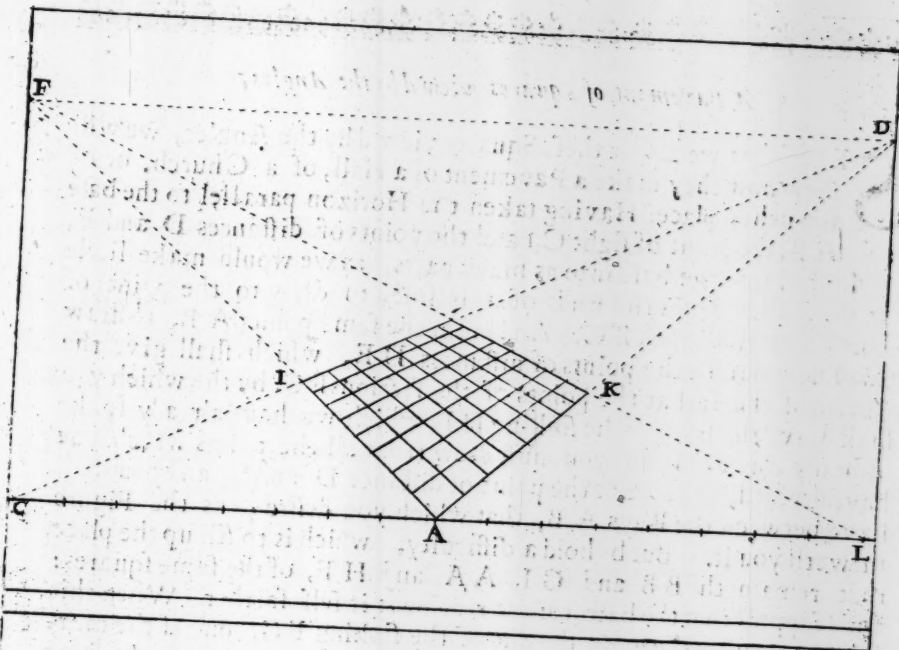
A Pavement of Squares view'd by the Angles.

SEing that we are at thefe Squares view'd by the Angles, we will
fhew how they make a Pavement of a Hall, of a Church, or of
any other place. Having taken the Horizon parallel to the bafe
A B, the point of fight C, and the points of diftances D and E,
we muft divide the bafe into as many parts, as we would make little
fquares. Then from the Ends of this line, to draw to the point of
fight C, as A C, and B C. And from the fame points A B, to draw
two Diagonals to the points of diftances D E, which fhall give the
Square of theHall at the points of the fectionsF G, by the which you
fhall draw the line of the finking H I, which we have already fpoke
of many times: Then you muft draw from all the points which you
have divided, the bafe at the point of diftance D and E, and you fhall
have between the Rays A B, that which you defire; as the Figure
fheweth you it. But behold a difficulty, which is to fill up the place
that remaineth B B and G I, A A, and H F, of the fame fquares:
for I fuppofe that the bafe cannot reach out it felf farther. When this
fhall happen, take upon the line of the finking F G, one of the mea-
fures of the fquares, as it might be K G, and tranfport it upon the fame
line H I, as many times as it can be there, and you fhall have the
points L M N O P Q and R, by the which drawing to the points of
the diftances you fhall make the fame fquares, as are the lines mark-
ed with points. This manner of tranfporting the meafures upon the
line of finking, fhall be practifed in other Pavements, which fhall fol-
low hereafter.

Of Squares compaffing a Border or Fillet.

THe Order of making the fecond Pavement, with a border about
it, is the fame with the fingle fquares view'd at front. Where-
fore we fhall not lofe the time in teaching it, feeing that we have
made already fo many Figures of it. Only I fhall advife, that
you muft divide the bafe into unequalParts, asA B and C, and to draw
all thefe divifions to the point of fight D, and where they fhall be di-
vided by the Diagonals A E and G F, then to draw lines Parallels to
the bafe, as you may fee in the figure.

✿✿✿✿✿✿✿✿✿✿✿✿✿✿✿✿✿✿✿✿✿✿✿✿✿✿✿✿✿✿✿✿✿
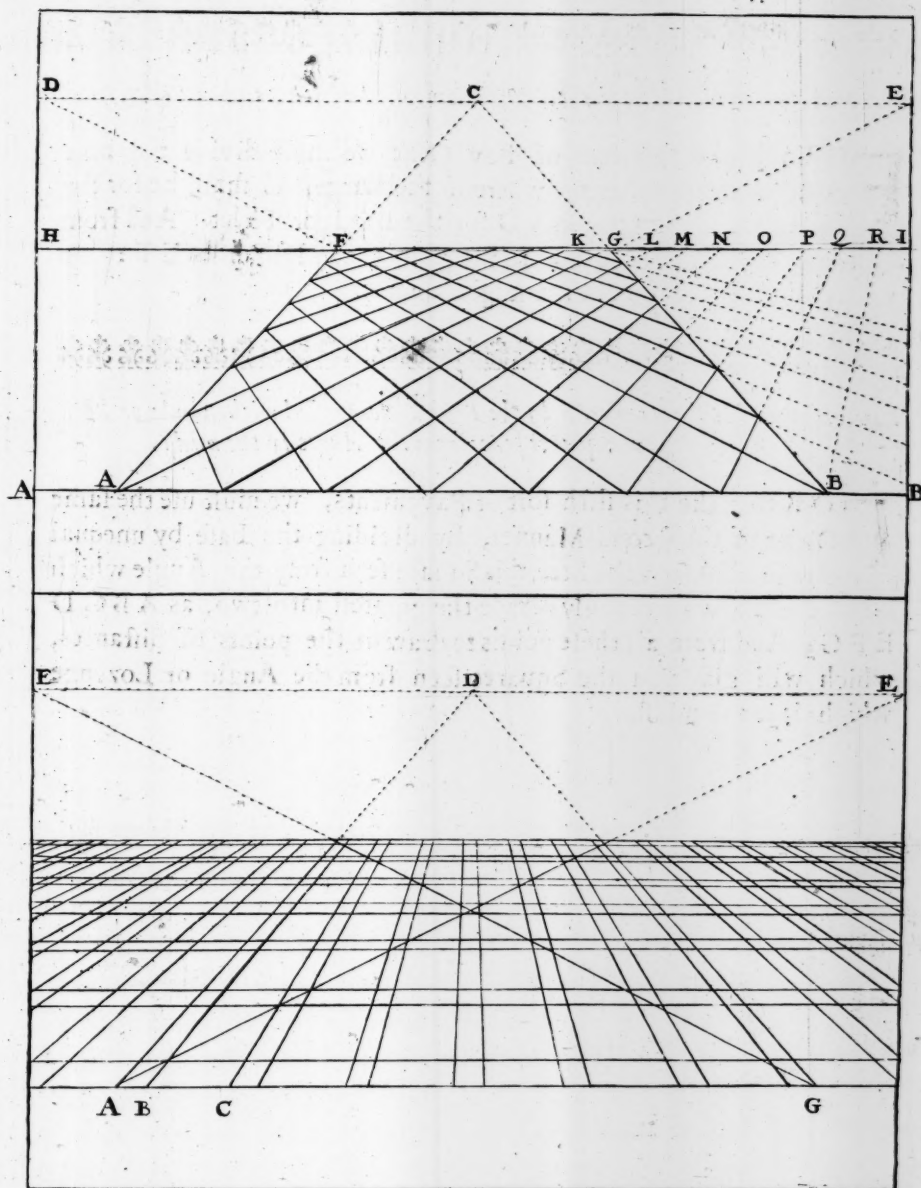
Pavements view'd by the Angle, Compassed with a Band or Fillet.

FOR to make this fort of Pavement we muſt divide the baſe A B, by unequal Parts, whereof the Largeſt C ſhall be for the Squares, and the little ones D for the Band or Fillet. And from all theſe diviſions to draw to the points of Diſtances E F: As we have done heretofore in the ſingle Squares.

✿✿✿✿✿✿✿✿✿✿✿✿✿✿✿✿✿✿✿✿✿✿✿✿✿✿✿✿✿✿✿✿✿

Pavements of Squares view'd by the Front, Compassed with Bands or Bor-
ders, which have Squares seen from the Angle in the midst.

FOR to make this fifth fort of Pavements, we muſt uſe the ſame Order of the ſecond Manner, by dividing the baſe by unequal Parts: but to make here this Square ſeen from the Angle which is in the midſt, we muſt only divide the greateſt into two, as A B C D E F G; And from all theſe points to draw to the points of diſtances, which will give you the Squares ſeen from the Angle or Lozenge which is in the midſt.

1 *fig.*

E   F

A C D C D C D C D C D C B

2 *fig.*

A   B   C   D   E   F   G
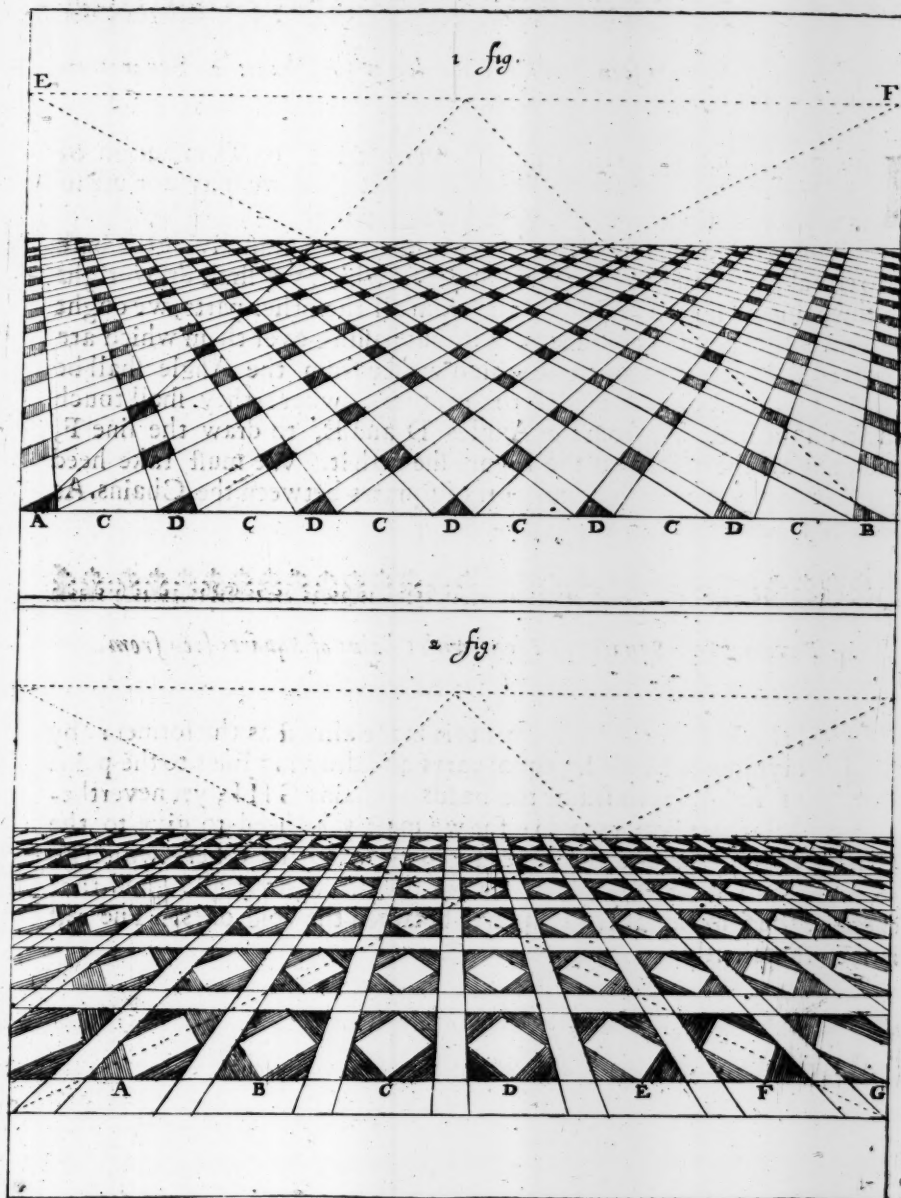
A Pavement of Squares seen from the Angle, with Chains of Squares on the Front.

I Suppose, that one hath made the Perspective, or Diminution of the Square for to draw the line of sinking, that we may not use so many Repetitions in the Pavements following.

For to make this fifth sort of Pavement, we must divide the base into equal parts, and to take some thereof, which we shall draw right to the point of sight as A B C; and from all the other parts, we ought to draw to the points of distances, without passing over them which are right: But after that all these which we see from the Angle shall be drawn, we must draw Parallels to the others, where they shall touch them on the side. As from the Angles D and E, to draw the line F, and so by all the others, as the Figure sheweth it. We must take heed to observe always the same number of squares between the Chains. As here of 3 between A B.

A Pavement of Squares in Front, with Chains of Squares seen from the Angle.

T HIS sixth sort of Pavements is made almost as the former: by dividing the base by equal parts, and drawing lines to the point of sight, for to frame the bands or chains G H I; yet nevertheless there is more to do; for we must take heed to give to the Chains that go across, the same largeness, as to the others which go to the point of sight O, which is a square throughout all: and that there be the same number of Squares between the void ones. The rest is seen sufficiently.

B   D   F   E   A   C

O

G   H   I
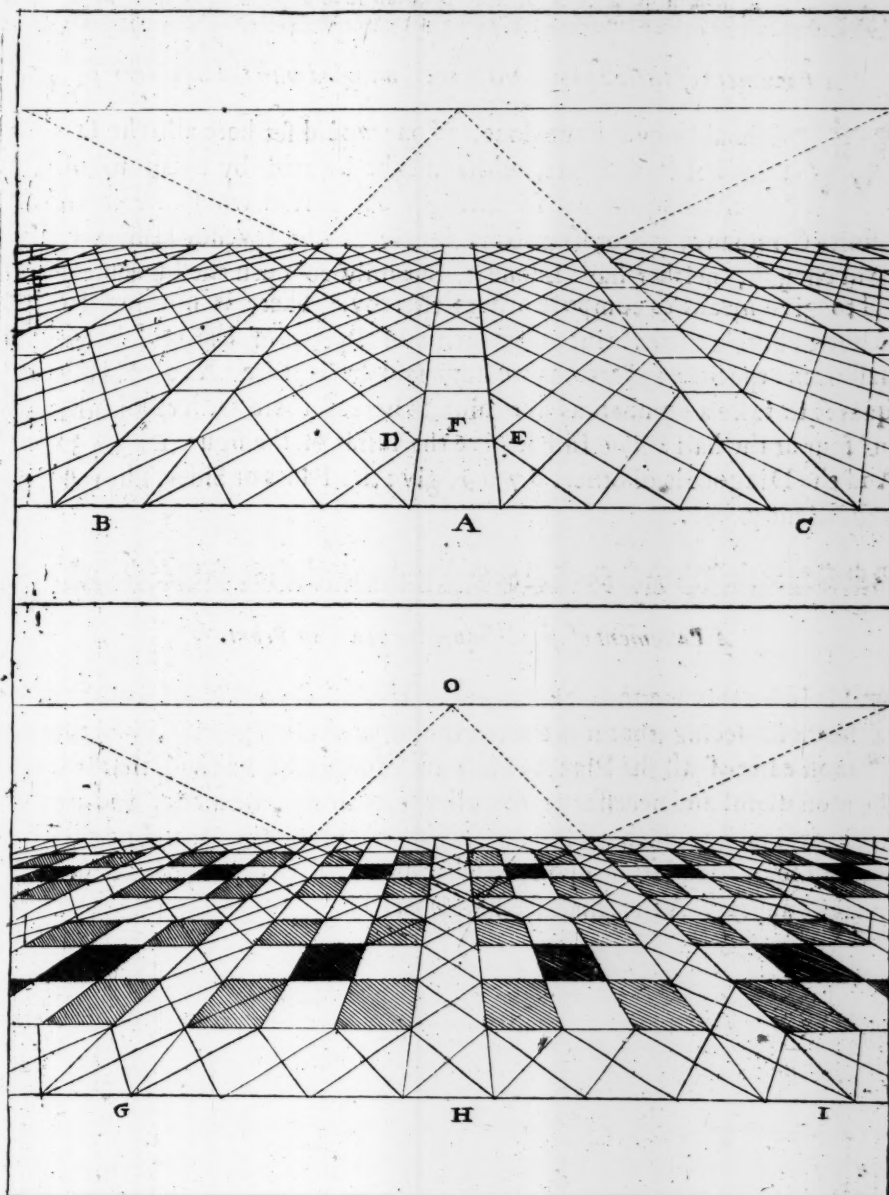
A Pavement of little Squares Octogones, mingled with the Squares.

WE should never have done, if one would set here all the fashions of Pavements, which might be made by the means of the little Squares: for an ingenious person would invent an infinite Company, according to his fancie. The seventh fashion is plain enough, neither have I done it, but only to open the Ingenuity, and to give means to compose others thereby. There is nothing to do but to divide the base into a quantity of Parts, of the which we shall frame the little squares, as we have said heretofore. And of these squares to take a number, as here nine, whereof there are five all full, and four at the half: The full do give the inside of the figure 1 2 3 4 5. And the Diagonals of others 6 7 8 9, give the Panes or Sides. The rest is sufficiently seen.

A Pavement of single Squares view'd in Front.

I Have set this manner of Pavement the last; not because it is the hardest, seeing that it is the beginning of all Perspective, and the most easie of all the Planes: but to cause to be known, that it is the most useful and necessary: for all the other may be made, and are made ordinarily, when all is done, serving only for ornament, And this serveth for a foundation, upon the which we raise that which we desire to make appear. As we shall see hereafter.

1. fig.
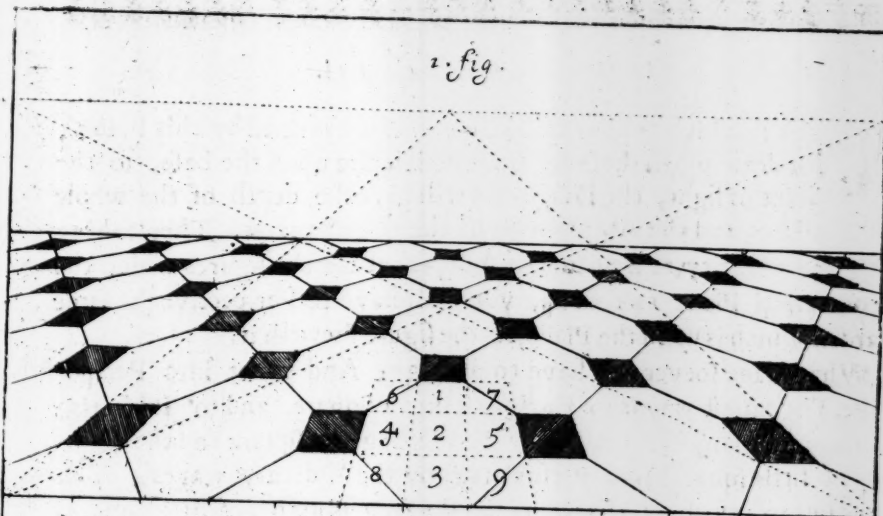
2 fig.
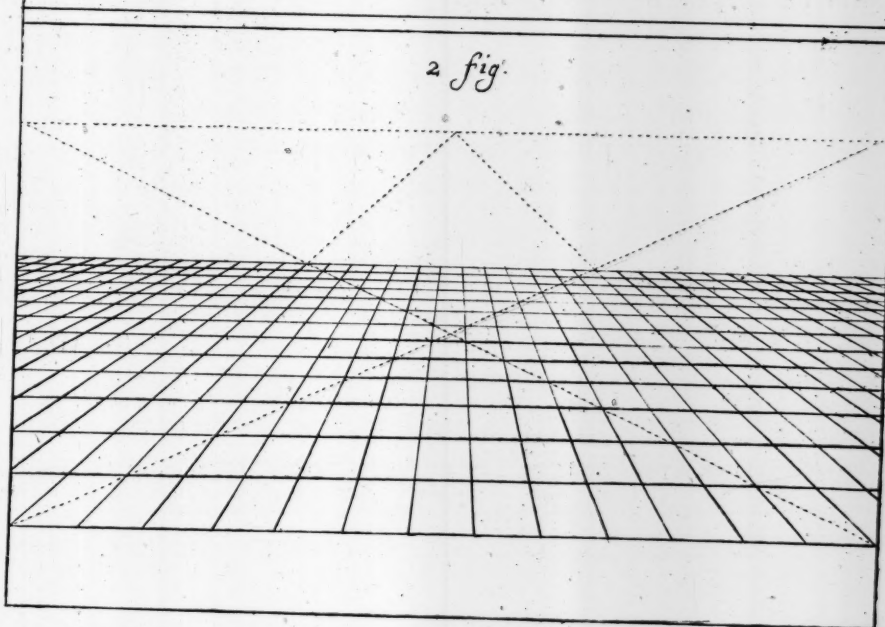
The Plane of a Garden abridged.

THAT which we are speaking of is confirmed by this Plane ; for drawing all these divisions which are upon the base, to the point of sight, the Diagonals will give the depth of the whole Plane, and the Abridgment of the little Squares, Then taking the same quantity, as well for the Alleys, as for the figures which the Geometrical Plane taketh up, you shall have in Perspective the same Garden, which is upon the Plane, As the figure sheweth it.

What plane soever you have to abridge ; And to set into Perspective: The easiest way is to Enclose it into a Square, and to divide this square into many little squares. For setting the square and the quantity of little squares into Perspective by the ordinary wayes ; You have but to take heed, that you take the same Number of little squares in the Plane abridged, as in the Geometricall Plane ; And you shall make in the one, the figure of the other.

X
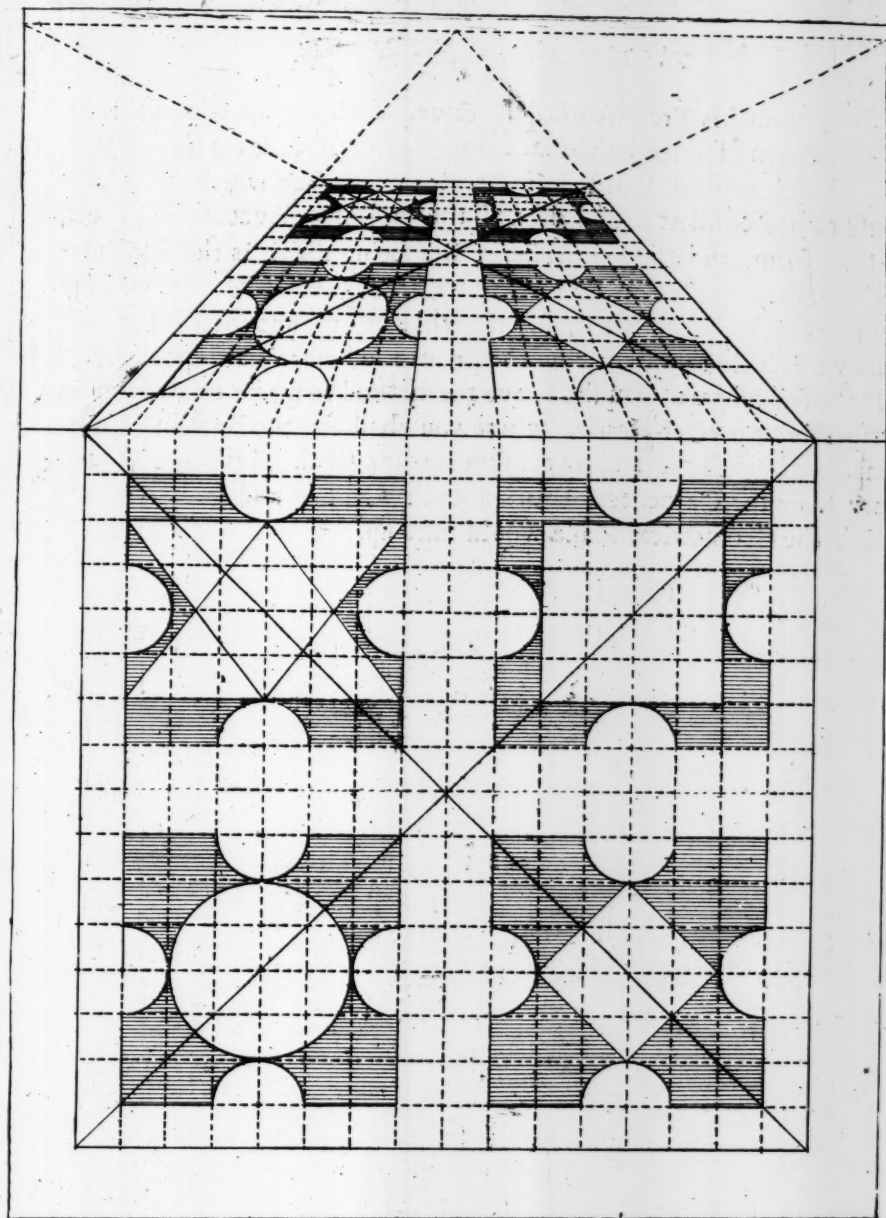
The Plane of a Building Abridged.

S*Erlio* in his Treatise of Pespective, doth highly esteem this In-
vention of setting the Planes into Perspective, as a thing very
useful to chief Builders or Architects, by the which they may
cause to be seen all at once a part of the buildings elevated, and the rest
in Plat-form, and as upon the base; But seeing that it is the same Or-
der with that of the Garden, which we are making now, we will say
nothing further of it. The Figure will cause to understand the rest,
and by this little to gather how the greater and more hard should be.

In the second part, you shall have the method to make to be seen in
Perspective a perfect House, where you shall see the Building finish-
ed and accomplished; and by the same means all the divisions of each
Story from the Carpenters Work unto the Cellar, and the only space
which the Geometrical Plane would take up.
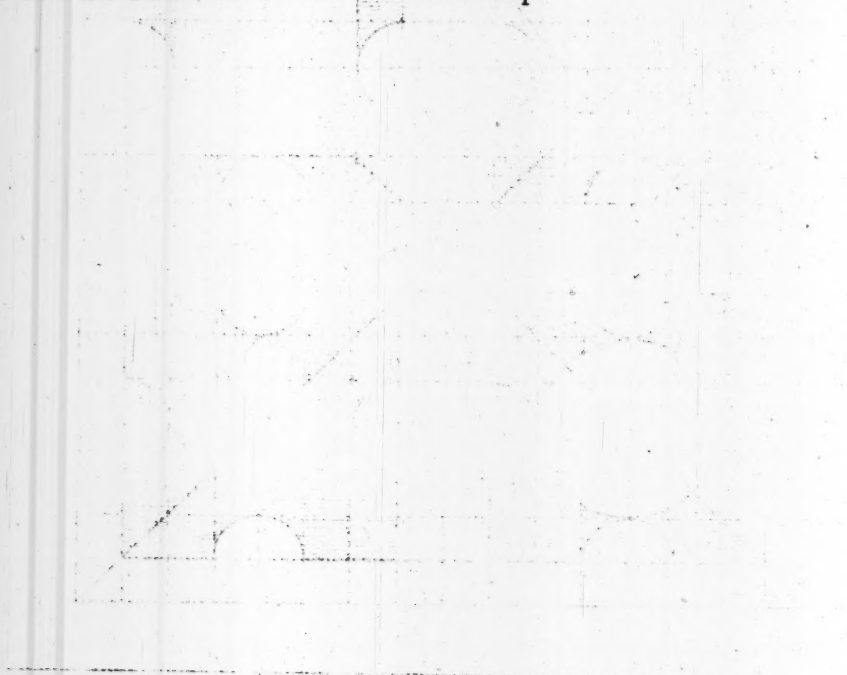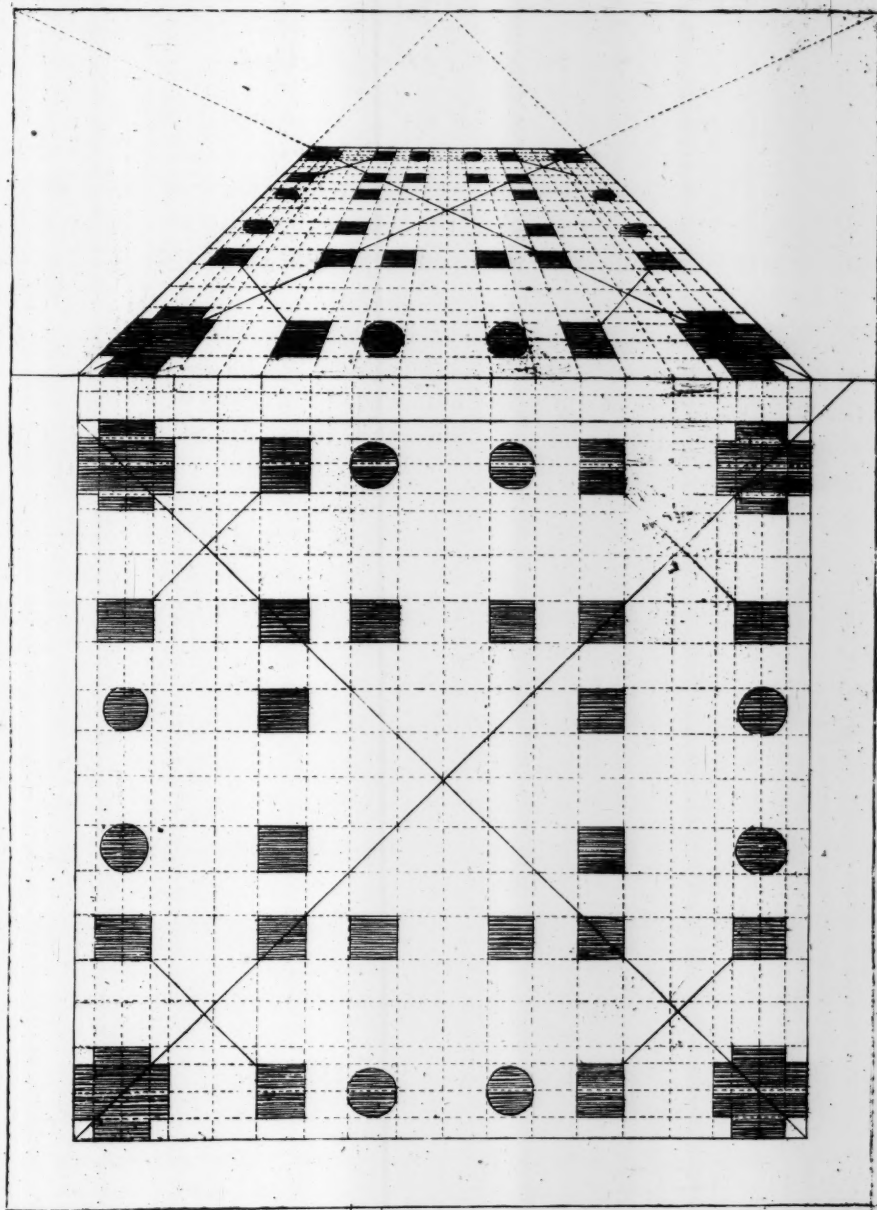
The Plane of a Church Abridged.

THis plane of a Church is made, according to that we have
said at the seventh Advice ; That is to say, that all the sides
which are Perpendicular to the Base, ought to be drawn upon
the Base, as are here the places of the Walls, and of the Pilasters ; and
from the Base to draw them to the point of sight ; And all the other
sides, which are Parallel to the Base, ought to be drawn on the side ;
And to mark upon a line as O P, all the bredths, as we see *A b c d e f g
h i k l.*   And then to transport all these Measures upon the Base, from
the which drawing to the point of distance, the sections of the outmost
Raye will give the Termes for to draw the Parallels, which will give
the Abridgement of every thing, the which is shewed by the Letters
a a, b b, c c, &c.

This manner of Abridging upon the outmost Radius, is practised by
many ;   But he that would believe me, will leave it, for to take the
Orders of the Eighth Advice, where we set a Perpendicular line at
the end of the Base, for to receive the sections, and to take away the
default of this present Practice, which doth not abridge it sufficiently,
if it be not that the points of distances are very far removed, for then
the effect is wholly alike to the other Methods.
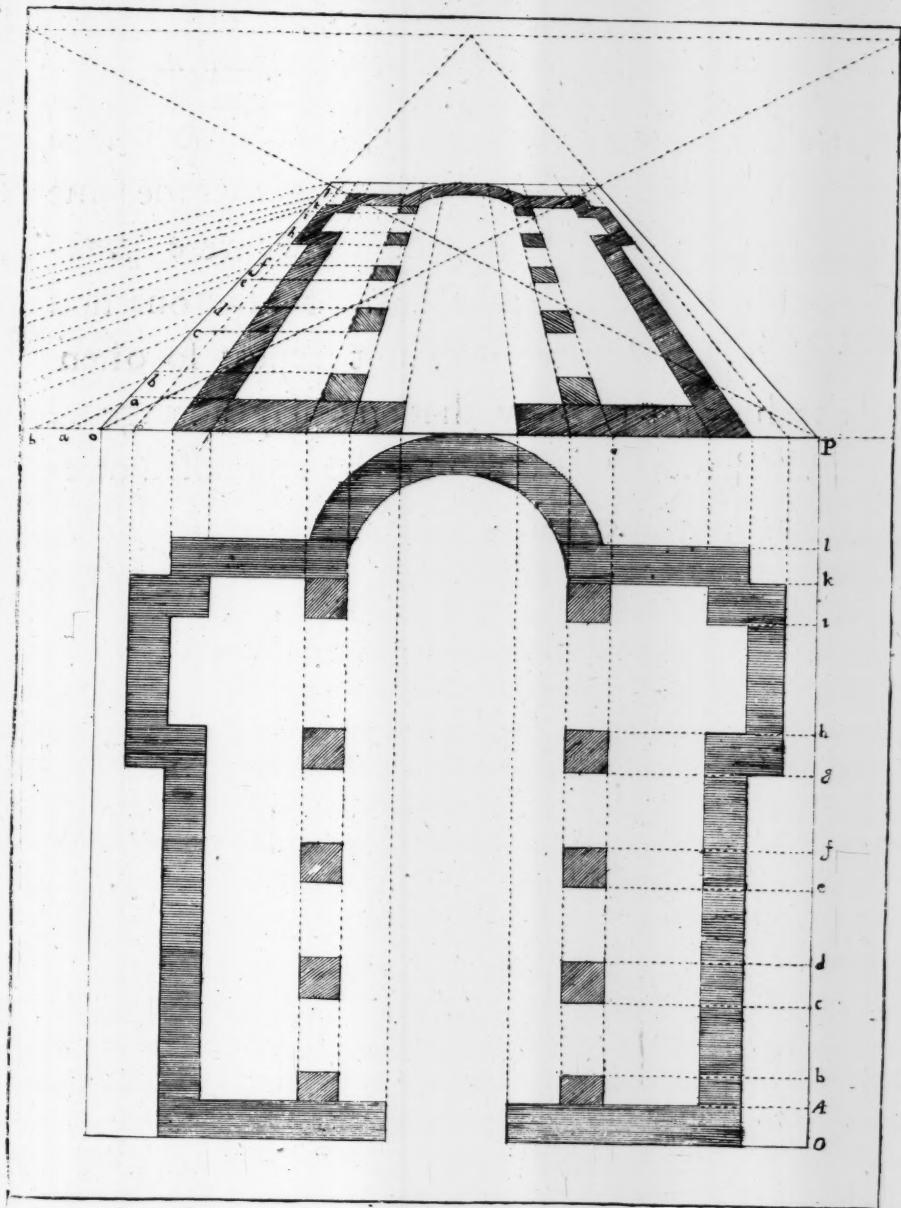
The Plane of an House with a Garden.

THE Order of setting this Plane of a
House in Perspective, is altogether the same
with that of the Garden, whereof we were speak-
ing; the which ought to suffice for the one and
for the other, that we may not repeat so often.
It is set here for to shew that one may abridge all
sorts of Planes, whether they be composed of e-
qual parts, or unequal.
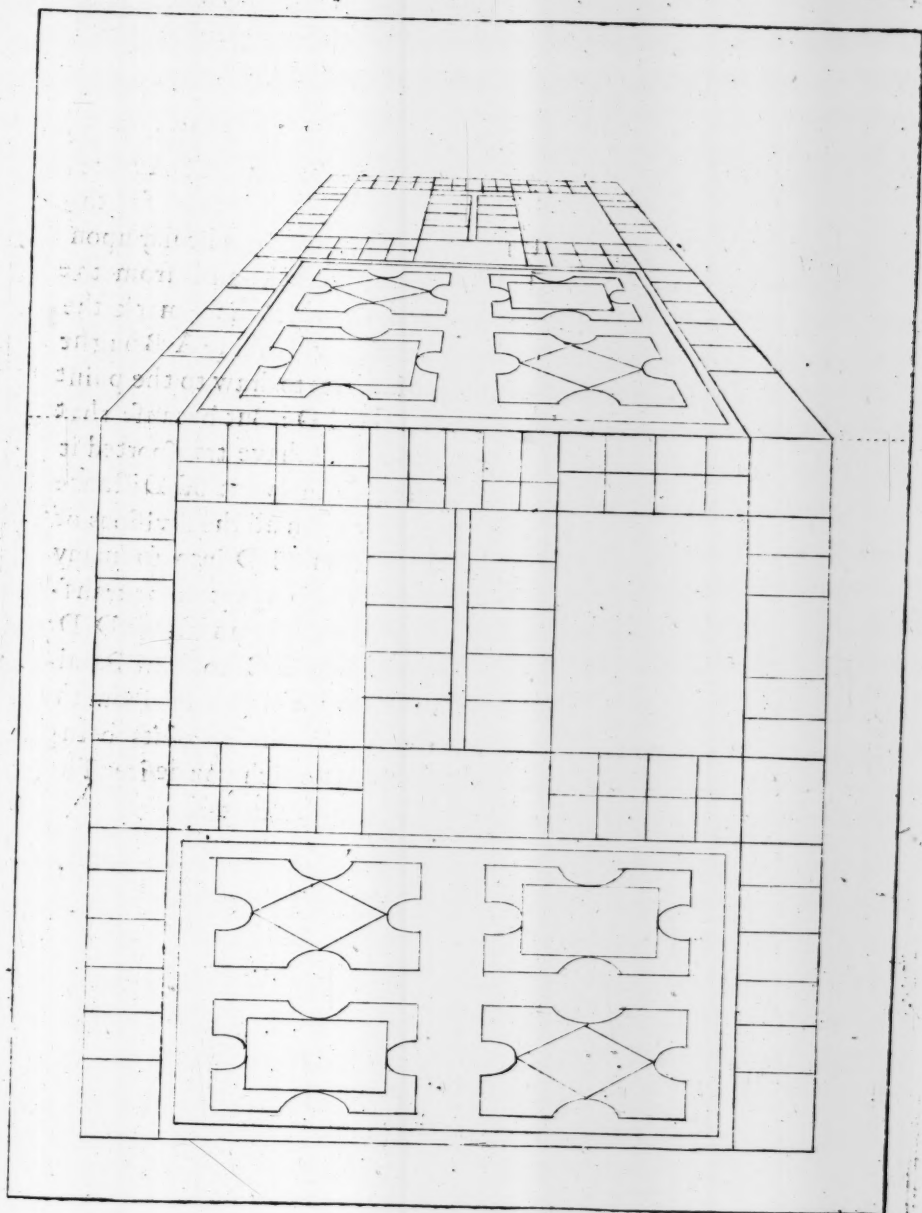
The Plane of a Fortification Abridged.

FOR to set all Fortifications, and whatsoever other Piece it be into Perspective; we must use the Sixth and the Eighth Advice. It is the Order that we spake of for the Church, and for the House. Which is to draw from all the Angles lines Perpendicular upon the base, and from the base Rays to the point of sight; and from the same Angles to draw also Parallels to the base, which shall mark the divisions upon the line on the side, as A B: The which line A B ought to be set upon the base: And from these Measures to draw to the point of distance for to give us the line of the section C D: But because that the Place suffereth us not to set it upon the base, I have transported it under the Figure, as is A B. Then having set the point of Distance in E, of the height E F: there you must draw from all the divisions of A B, to the end to divide the line of the section C D into so many parts: The which line C D, with its divisions, ought to be transported to the foot of the outmost Ray, or on the one side and other D D: And from all these Points which are upon the line D C, to draw Parallels: or else only to mark a point upon the Ray, which goeth from the Angle of the Plane, which is proper to it; And all these Points being joyned together of the lines, will give you that which you desire. The Figure will serve to make one understand the Order better.

Horizon

C   C

D   D

A

Horizon   B   E

C

B

A   D   F

I..
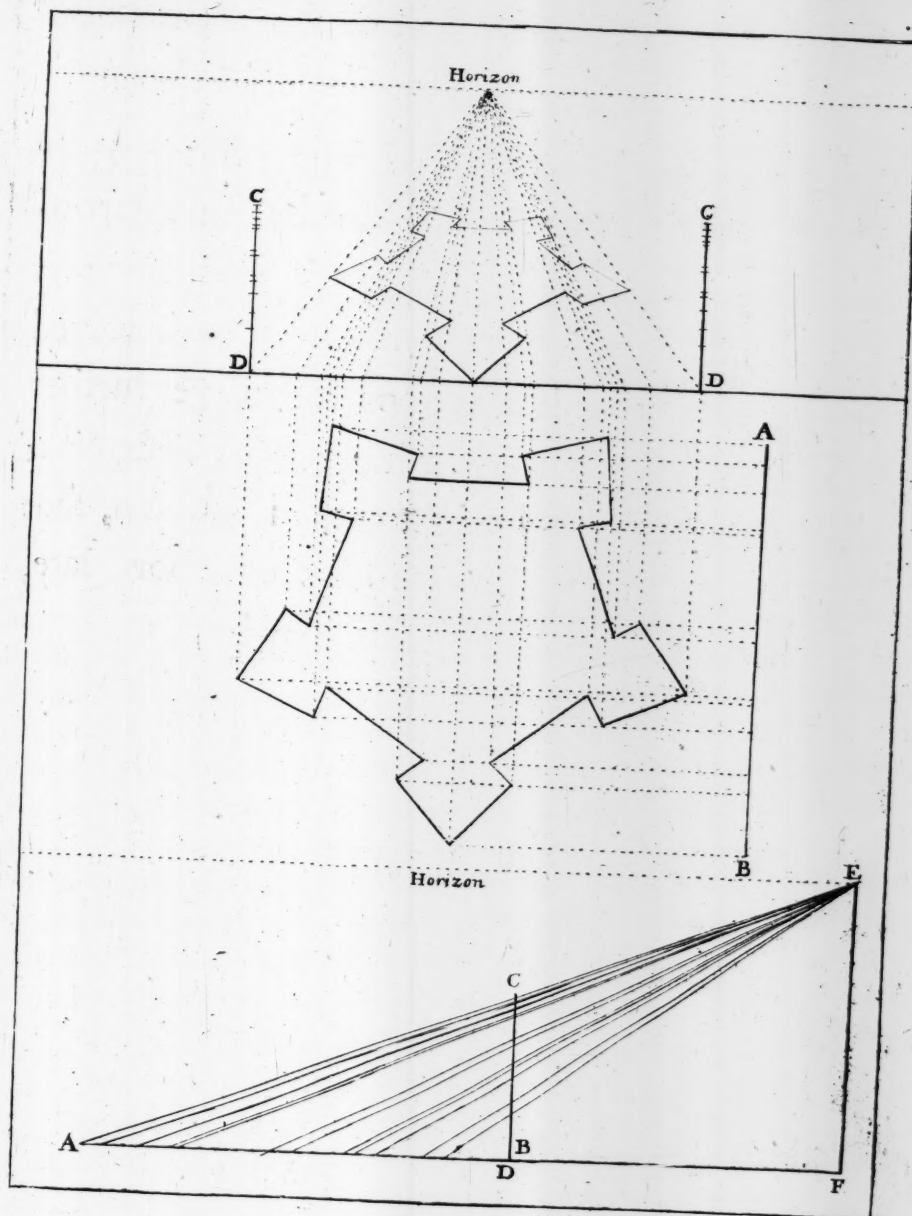
A *Plane* and *Figure* *Irregular* abbreviated.

HE which shall do well, that which we are about to leave, shall not be much trouqled with all the rest; for this is that which is the hardest of Planes in Perspective. I beleeved nevertheless, that it was good to set yet further something irregular; which appeared difficult at the first sight; that *I* might make it known, that there is nothing which one may not abbreviate, of whatsoever view or Aspect it may be.

Horizon

Horizon
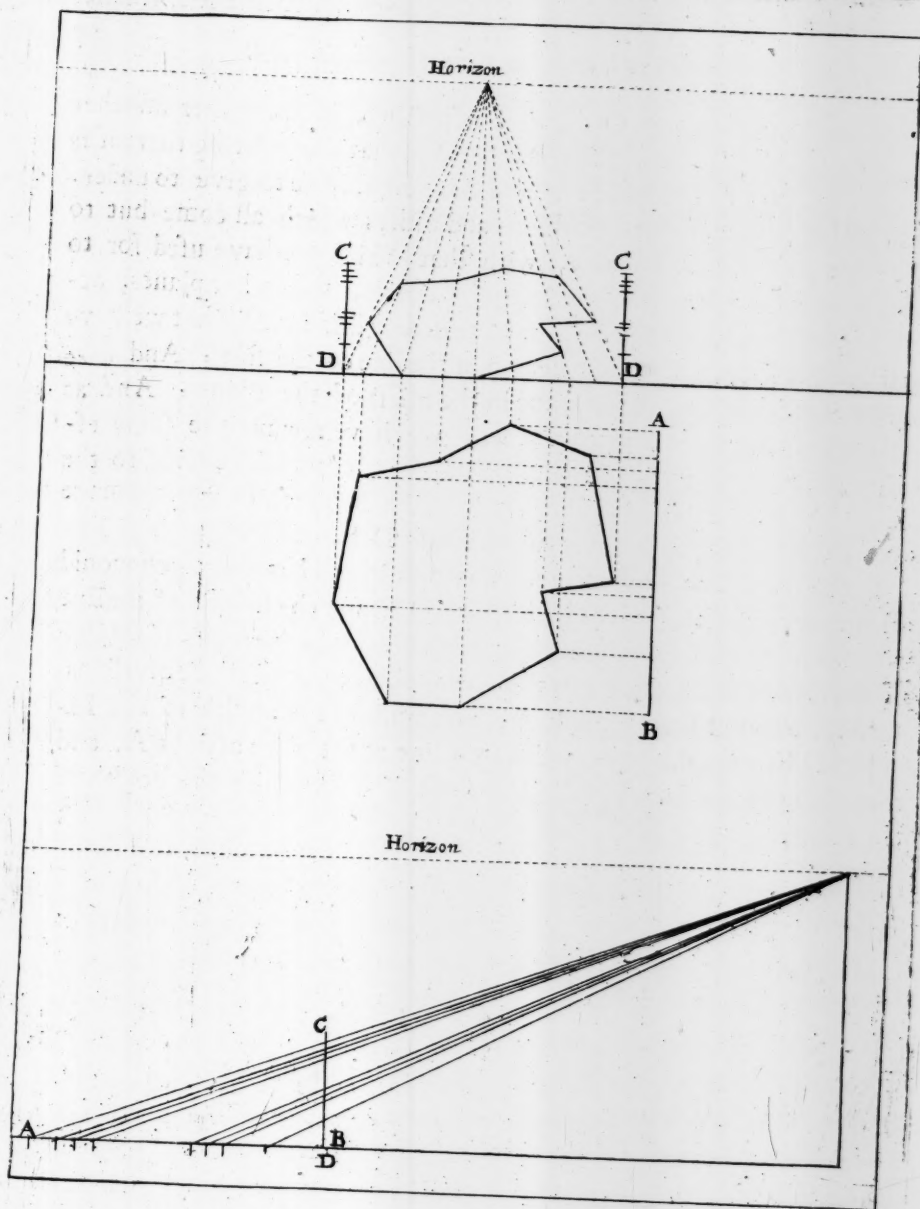
Another Plane of a Church abbreviated.

IT feemeth that this Order of Perfpective, is altogether another then that which we have ufed, becaufe that the ordering thereof is not the fame. The which I have done on purpofe to give to underftand, that there are many fafhions and orders which all come but to the fame; for this is the fame, with that which we have ufed for to abridge the Fortifications, the irregular Pieces, and other planes, according to the eighth Advice: with this only difference, That we have marked the Parallels o the bafe, upon the line on the fide; And here we have marked them upon a line in the midft of the Plane; And as well in the one manner as the other, we have always the fame effect: for drawing from all the divifions of this line of the midft to the Eye A, you fhall have the line of the fection B C, which fhall be made upon the line, which we may call the bafe D E.

For to fet it into Perfpective, tranfport into what place you would all the length of the bafe as here above D E, and the height of the Eye A F. Then having fet on the one fide and other, or in the midft of the line of the fection B C, draw Parallels to the bafe, by all thefe divifions, unto the outmoft Ray D A, E A; you muft fet the bredth of the Pilafters D K, upon the bafe, and draw a line at the point of fight A, and the fection of the lines Parallels by thefe K A, fhall be the bredth of the Pilafters.
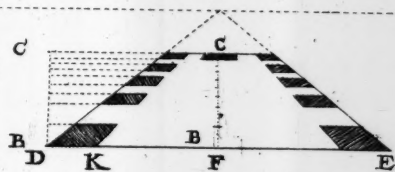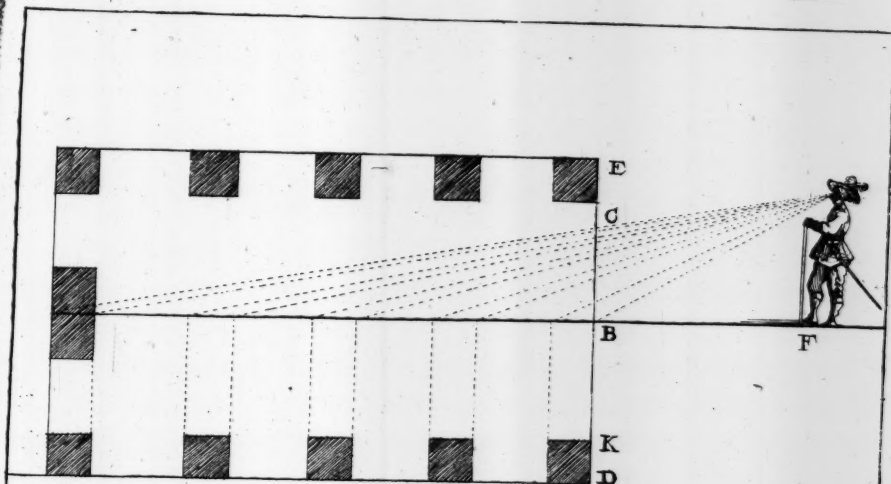
E

C

B F

K
D

C C

B B

D K F E

THE
ORDERS
OF THE
ELEVATIONS.

Some Necessary Advice, for the Orders following.

IT seemeth to me that I have given sufficiently to understand that which belongeth to the Ichnography, and Planigraphy, or description of Planes, which is necessary for the foundation of Orthography, and Scenography. The Orthography is the face, or fore-part &c. As one may see in the Definitions. Scenography, is the Elevation of all that which any one hath a designe to make &c. See the Definitions which are at the beginning of this Book.

For to make this more clear to those that are not acquainted with these words; we shall Name hereafter(as I said already in the Definitions) the Ichnography, the Plane, and the Orthography, and Scenography, by a Word common to the one and the other, the Elevation: So that, instead of saying the Orthography, we shall say the Elevation of the fore-part; And for Scenography, the Elevation of the whole.

Before we pass any further it must be observed, that the Elevations do never give to the eye all the Angles of the Plane, and the Quantity of faces depend on the Aspect, which causeth the object to be seen: for if it be seen on the front as the figure A, it will shew but one face, although that the Plane have four; If it be view'd from the Angle, although on the front it will shew two, as B, and never more, with what Aspect soever one look on it. This ought to be understood of a square, seeing that figures with divers Panes, may give thereof 3 4 5 and more. Now it is, that if the objects decline a little from the point of sight, they are seen from the Angle, whence they ought to shew two faces; And the further they are removed from the point of sight, the more they are discovered. As K E are more discovered then C L, although their thickness be equal.

Another thing also that is further to be marked is, That which is Parallel to the Horizon, when the object is view'd in front, although in Perspective, as C D E F from the Gate in the first figure, becometh a visual Ray; when the same object is view'd being in a Return, or obliquely. As in the second figure, that C D E F, which is in the front above, is made a visual Ray to that which is under: And on the contrary, that which is a Ray to that above, is made a Parallel to the base to that below, as D G F H L. The Perpendiculars are always Perpendiculars.

1. fig.

A   C D   E F

2. fig

B   C D   E H
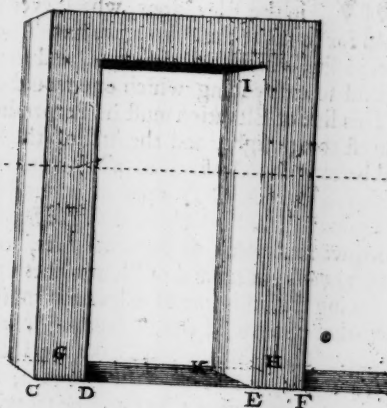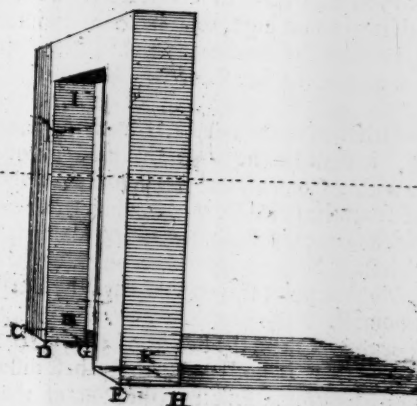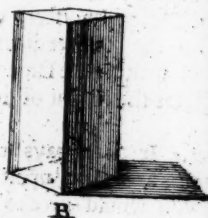
*Of the Line of Elevation for to give the Heights to all kinde of Bodies and Fi-
gures, and in such a Place as one would within a Plane.*

WE muſt endeavor to underſtand well, and remember this Rule : which is of
ſuch importance, that he that ſhall know it perfectly, will not be troubled
in the Elevations, whatſoever they be of.

As for to make the Planes, we have uſed the baſe for the Elevations : we ought alſo
to uſe a line which ſhall direct us, and ſhall bring the Meaſures of the Heights that are
needful to every thing which one would elevate.

This line of Elevation muſt be Perpendicular upon the baſe A B, which is always the
neareſt to our ſight, and the firſt of the Plane : By conſequence, capable of giving
and bearing the Meaſures of all that one would make in the Picture, and therefore the
line of Elevation C D is placed upon the line A B Perpendicularly, as all thoſe muſt
be upon the Plane which we ſhall uſe henceforward. We muſt then remember, that
when we ſhall ſpeak of Perpendicules, or Perpendicks, in the reſt of our Orders, we
muſt always underſtand of Plumb-lines upon the Plane or baſe.

Seeing that this line of Elevation muſt receive and give the Heights to all the Ob-
jects that one would elevate from a Plane : it muſt have the ſame Horizon with the
Plane. Therefore we muſt from the foot of this line, which one may ſet on the left
or right ſide, draw within the Horizon, as one would have it, that is to ſay, that it is
no great matter where the Point be ſet within the Horizon : for in what place ſoever
it be, it will always give the ſame effect, as it is from the foot of the line C to the point
E, one may ſet it at the point of ſight, if one will. I have ſet this line on the one ſide
and other in the firſt Figure, and their point different within the Horizon, for to give
to underſtand that it is well throughout.

If from the point H, which is in the Plane of the ſecond Figure, you would elevate
a line of two foot high ; you muſt ſet upon the line of Elevation two equal Parts,
which you ſhall make to ſerve each for a foot, beginning at the point C, as are C F,
which is two foot high, to draw to the point E, and you ſhall have an Elevation of two
feet, between the two lines C and F, drawn to the point E.

For to give the height of two feet to a line elevated from the point H: you muſt
from the point H draw a Parallel occult to the baſe, until that it divide the line below C
E, which ſhall be the point I. If from the point I one elevate a Perpendicule I K, between
C F, it ſhall be the height that it ought for the line of the point H, which you muſt
take with a Compaſs and carry it to the point H, which will give H L of two feet high.

If from the point M, you would have one of the ſame height of two feet, you muſt
make the ſame Operation, and you ſhall have between C F the Perpendicule N O,
which ſhall be the height that it ought at the point M. And making the ſame Operati-
on from the point P, you ſhall have the Perpendicule Q R, for the height of the line of
the point P.

For to give them the height of 3, 4, 5, 10, 20 and 30 feet. It is always the ſame
Order ; there is nothing but to ſet theſe diſtances and heights aboveſaid upon the line
of the Elevation. And from the point of the height, that you would give to draw to
the point of the line within the Horizon, which is here the point E, and to make all the
ſame Operations, which we are about making: and you ſhall have that which you deſire.

The two diagrams on this page show perspective grids with labeled points.

First diagram labels: D, E, O, E, Horiſon, D, A, C, C, B

Second diagram labels: D, E, O, Horiſon, R, K, Q, N, L, F, I, H, A, C, B
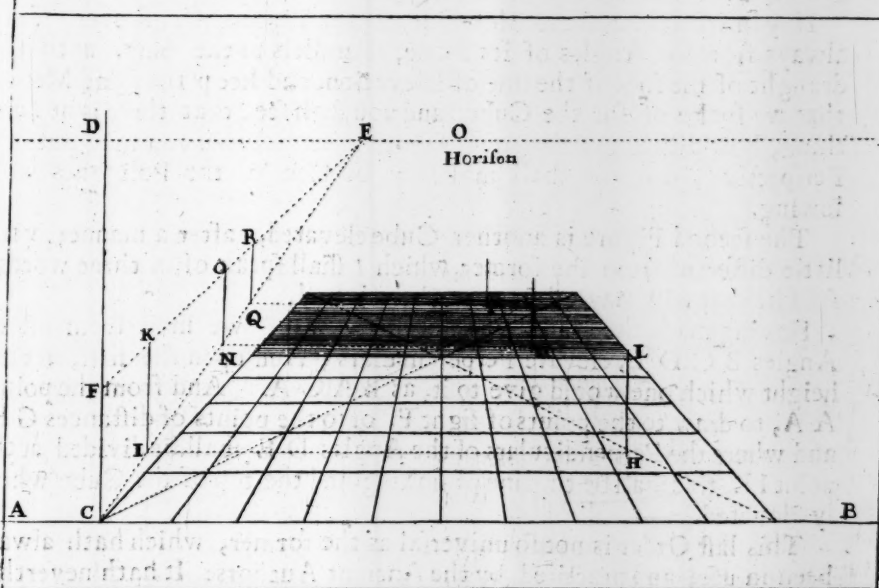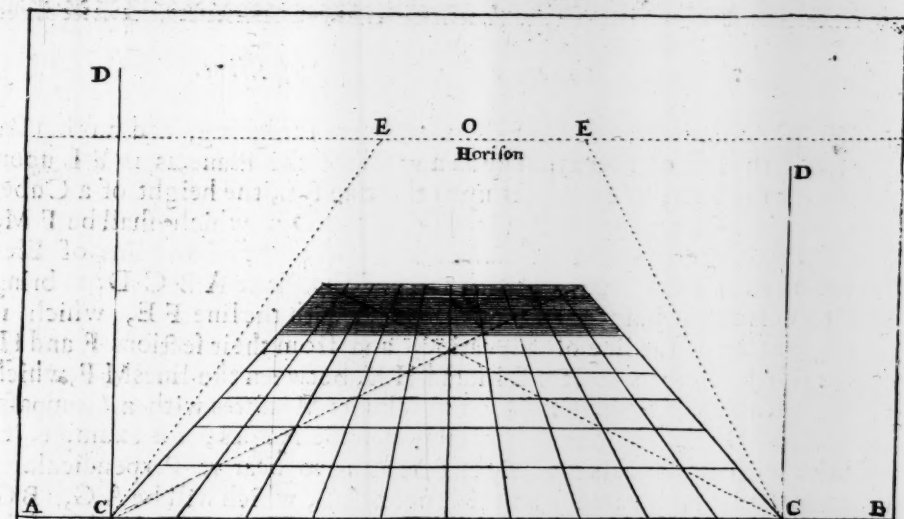
The Elevation of a Cube in Perspective.

HAving made the Plane by the Orders foregoing, and having set the line of Elevation upon any side of the Plane, as is F L upon the bafe; We muft fet upon this line F L, the height of a Cube, which is a Figure fquare on all the fides, as a Dy, which fhall be F M, from which points F M we muft draw to the point of the line of Elevation E.   Then from all the Angles of the Plane A B C D, to bring Parallels to the bafe, until that they meet with the line F E, which is the bottom of the line of Elevation, and from their fections F and H, to raife the Perpendiculars F M and H K, between the lines M F, which are drawn at the point E.   Then to take its Meafures with a Compafs, and to bring them Perpendicularly upon the Angles; for example, to take with a Compafs the height F M, and to bear it Perpendicularly upon the lines elevated from the Angles A B, which will be A G, B G. Then to take alfo the height H K, and to carry it upon the Angles of the bottom C D, which fhall give CO D O; then to joyn the right lines G O O G.   This fhall be the Cube elevated.

If you would have the Elevation of any Figure whatfoever, draw always from the Angles of its Plane, Parallels to the bafe, unto the draught of the foot of the line of Elevation, and keep the fame Method that we fpake of for the Cube, and you fhall fee, that there is not any thing, how difficult and unequal foever it be, but that you may put into Perfpective; as we fhall make to be feen in the Poligones following.

The fecond Figure is another Cube elevated, after a manner, very little different from the former, which I fhall fpeak of in three words : And he that will may ufe it, not to be rejected.

Having made the Plane by the ordinary way, we muft from all its Angles B C D E, elevate Perpendiculars; And upon the firft, fet the height which one would give to it, as B A C A.   And from the points A A, to draw to the points of fight F, or to the points of diftances G H, and where the Perpendiculars of the Angles D E fhall be divided at the point I L, this fhall be the line of finking, and the top of the Cube wholly elevated.

This laft Order is not fo univerfal as the former, which hath always been in ufe, and practifed by the Ancient Authors: It hath neverthelefs fome benefits, which we fhall know in fome of the Orders following.
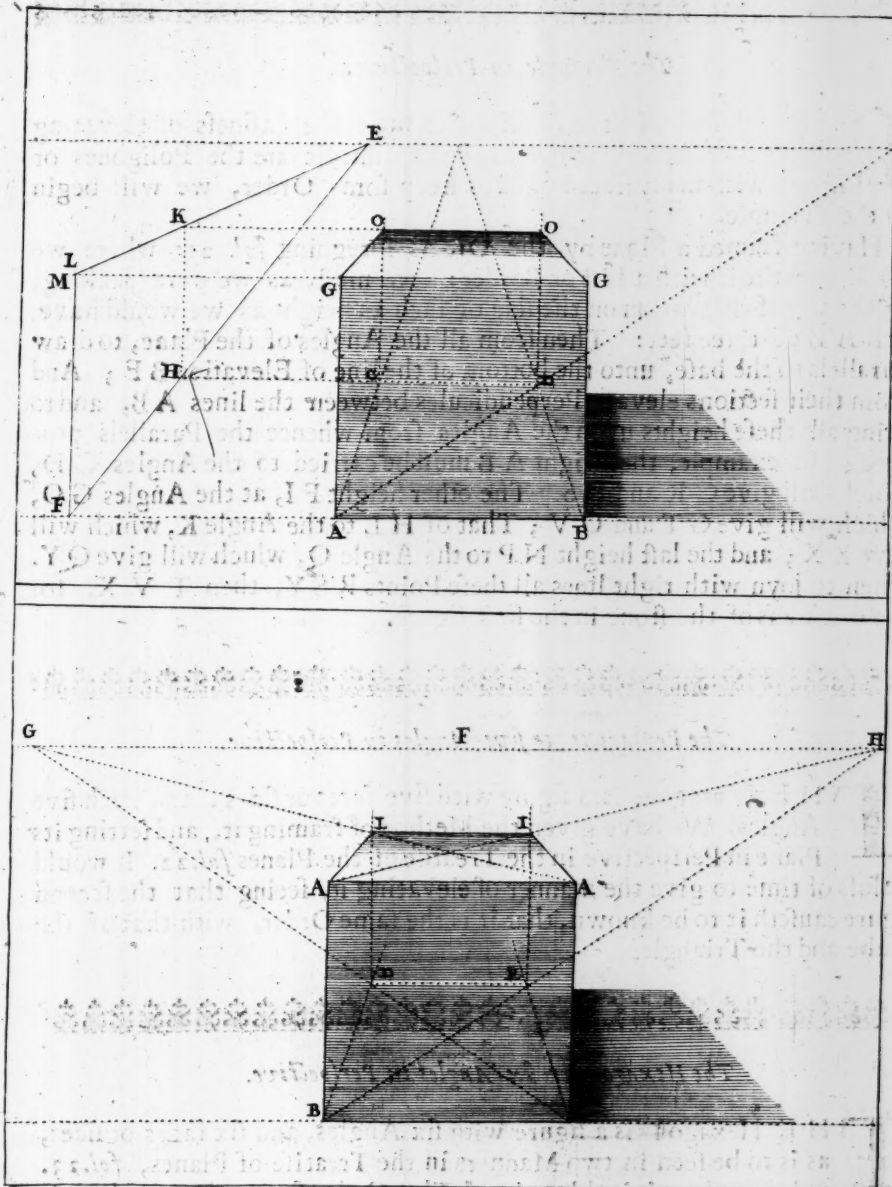
The Triangle in Perspective.

IN the first Order I have promised to make the easiness of elevating all Figures appear, whereof the most difficult are the Poligones or Figures with many sides: and to keep some Order, we will begin by the Triangle.

Having framed a Plane by the Orders foregoing *fol.* 21: where we teach to make it with a List or Border: we must, as we were speaking, set the line of Elevation on the side of such an height as we would have, as is A B of three feet: Then from all the Angles of the Plane, to draw Parallels to the base, unto the bottom of the line of Elevation B E ; And from their sections elevate Perpendicules between the lines A B, and to bring all these heights upon the Angles from whence the Parallels proceed ; for example, the height A B must be carried to the Angles C D, which will give C R and D S. The other height F I, at the Angles G O, which will give G T and O V ; That of H L to the Angle K, which will give K X ; and the last height N P to the Angle Q, which will give Q Y. Then to joyn with right lines all these Points R S Y, then T V X, for the thickness of the stone in the first figure.

The Pentagone, or five-Angles in Perspective.

THE Pentagone is a figure with five faces or sides ; and with five Angles. We have given the Method of framing it, and setting its Plane in Perspective in the Treatise of the Planes *fol.* 22. It would be loss of time to give the manner of elevating it, seeing that the second figure causeth it to be known, that it is the same Order, with that of the Cube and the Triangle.

The Hexagone or six-Angles in Perspective.

THE Hexagone is a figure with six Angles, and six faces or sides, as is to be seen in two Manners in the Treatise of Planes, *fol.* 23. and 27. where it is abbreviated. The Order for to elevate them is to be seen sufficiently in the third figure.

1.fig

2.fig

3.fig
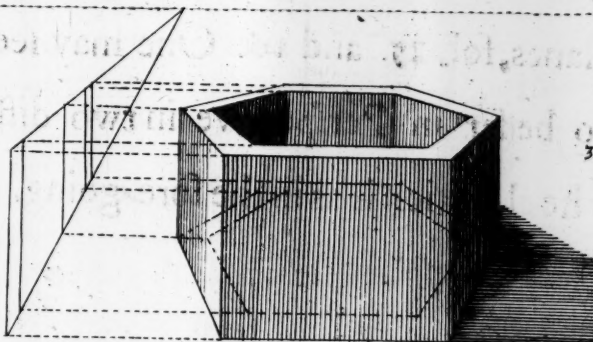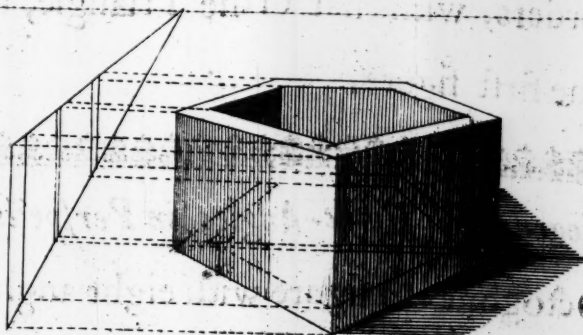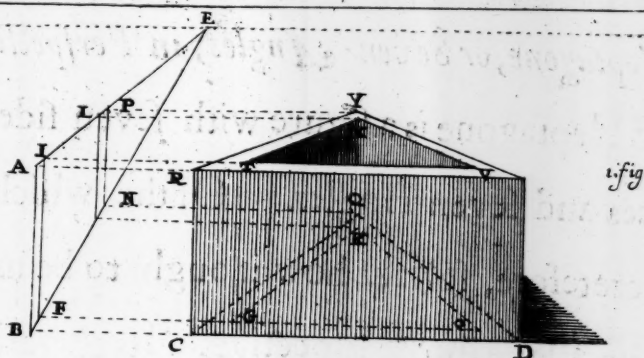
Of the Heptagone, or Seven-Angles, in Perspective.

THE Heptagone is a figure with seven sides or faces and seven Angles. Of the which we have set heretefore, fol. 24, how it ought to be made, and to set its Plane into Perspective. Its elevation is the same Orders, with that of the Triangle, as one may see in the first figure.

Of the Octogone, or Eight-Angles, in Perspective.

THE Octogone is a figure with eight angles, and eight faces, as the second figure sheweth it, in the Treaty of planes, fol. 25. and 26. One may see how it ought to be set in Perspective in two different Manners. The elevation is as in the fore-going.
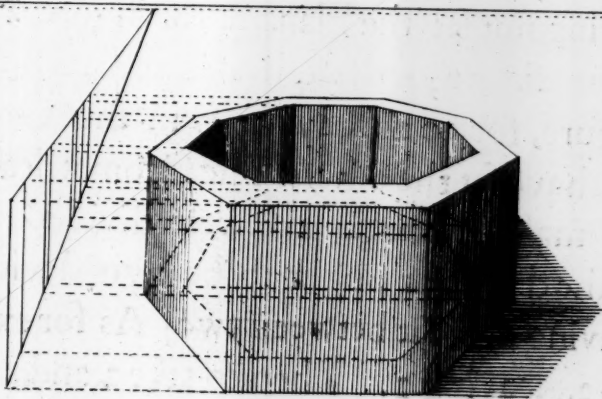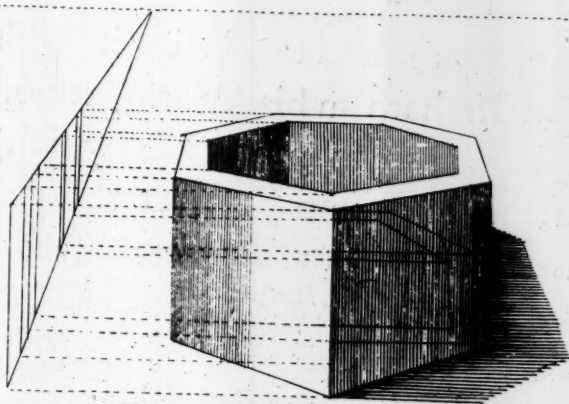
A double Cross in Perspective.

I have set this figure, and that below it, which the
Sieur *Marolois* hath in his Works, according to
the first Order that we follow.   The which would
be more difficult to set into Perspective by another
manner of the diversity of the Angles.   And by this
Method it is very easy, Elevating it from all the angles
of the Plane &c.   as we have said of the Polygones,
and may be seen cleerly in the first figure.

A Stone-fluted, or straked like a starr, in Perspective.

HAving not set the Plane of this figure with the
other figure; I thought it fit to set it under its
figure, for to abbreviate it in the Ordinary
way, as we have set the others. The Geometrical Plane
is easy to make.   This is a Circle divided into six,
whereof the divisions ought to be joyned with right
lines, leaving a Point between two; As for example,
from 1, to 3. leaving 2.   Then to take 2 and 4, leav-
ing 3. and so others ; the rest is seen sufficiently in the
second figure.

1 fig

2 fig
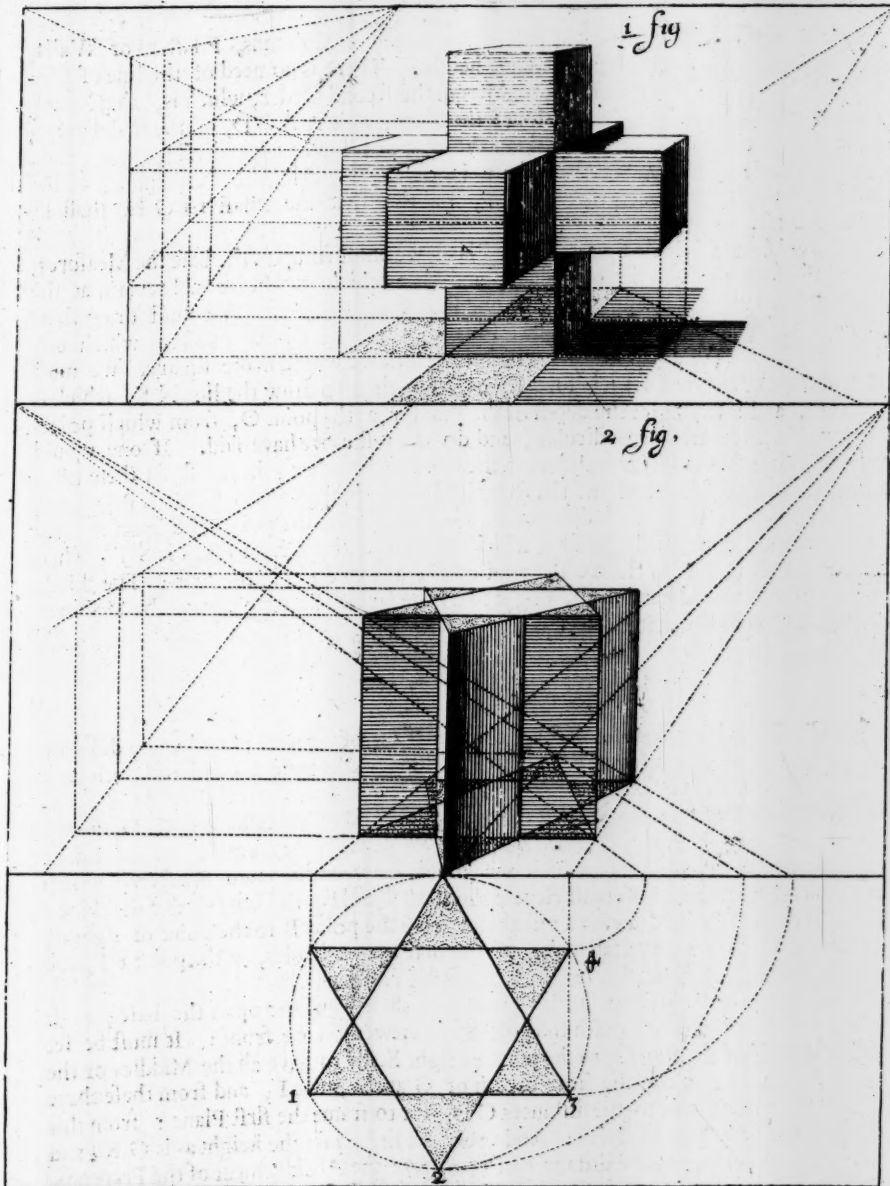
Of Pilasters in Perspective.

VV HEN one would make some Pieces, as Columns, Pilasters or Walls, which shall have the same height. There is no need of the line of Elevation: It sufficeth to do as in the second Order, which is, that having elevated Perpendiculars from the Angles of the Plane, as is A B C D, of the first figure; we must set the height that we would upon the first or second Perpendicule, as is A F, or D E. Then to draw the Ray E to the point of sight F; All the Perpendicules that one shall elevate, must be unto this line E F, and then that the Pilasters G H, shall be equal to the first.

If one would not use little squares in the Plane, we must set upon the base the Measures, and draw the Rays to the point of sight F, and that which ought to abbreviate at the point of distance K; for example, L M is one side of the Pilaster: We must draw these two Points L M, to the points of sight F for the bredth of all the Pilasters which one shall set there; for the depth of each Pilaster, which we would make square, we must take the distance L M, and set it before L, as is N; then to draw the line N K, which is the distance, and it shall give the depth of the Pilaster at the point O, from which points L M O, we must elevate Perpendicules, and do the rest as we have said. If one would have the bredth of two Pilasters, between the one and the other; he must set them upon the base, and after set the depth of the second Pilaster equal to the first, as is P Q; and from these two points P.Q. to the distance K, which shall give the points R S, upon the Ray I. from S; we must draw a little Parallel, which shall divide the Ray M F, as is S T; then from these points R S T, to elevate Perpendicules, and to do as in the first: The third, and more, if one would have them, ought to do the same, keeping always the Measures upon the base, as in the first Figure.

Of Pilasters viewed by the Angle.

VV E have said heretofore, that the Plane of squares is made, by drawing Measures from the base to the Distances. As concerning the Elevations, it is the same that we are speaking of. For having set the height A B, upon the first Perpendicule, we must draw from the point B to the distances C D, which shall divide and give the heights to the two other Perpendicules elevated on the sides: Then having given the Distances, which one would, between the two Pilasters, which are here two little squares, you must elevate the second; and by the same Order the third: Their height shall be found drawing a visual Ray from the point B to the point of sight E, at the section, which this Ray shall make of the first Perpendicules, at the point F F, and from the points F F, to the distances, as in the first Pilaster.

Those which are made without a Plane, must take their Measures upon the base; as if one would give them the like bredth to those above viewed on the front: It must be set as G H, and to draw the Ray G, to the point of sight E, for to have all the Middles or the Diameters: Then to set also the same bredth of G at the point I; and from these three points G H I, to bring lines to the distances C D, for to frame the first Plane: from this Plane he must elevate Perpendicules: And upon the first to set the height as is G K; and from the point K to draw to the distances, for to have the Abridgement of the Perpendicules of the sides, for the second Pilaster. The same shallbe done from the Points L. M. And the third, from the points N O. The rest is easy enough to doe, viewing the second figure.

1 fig

2 fig
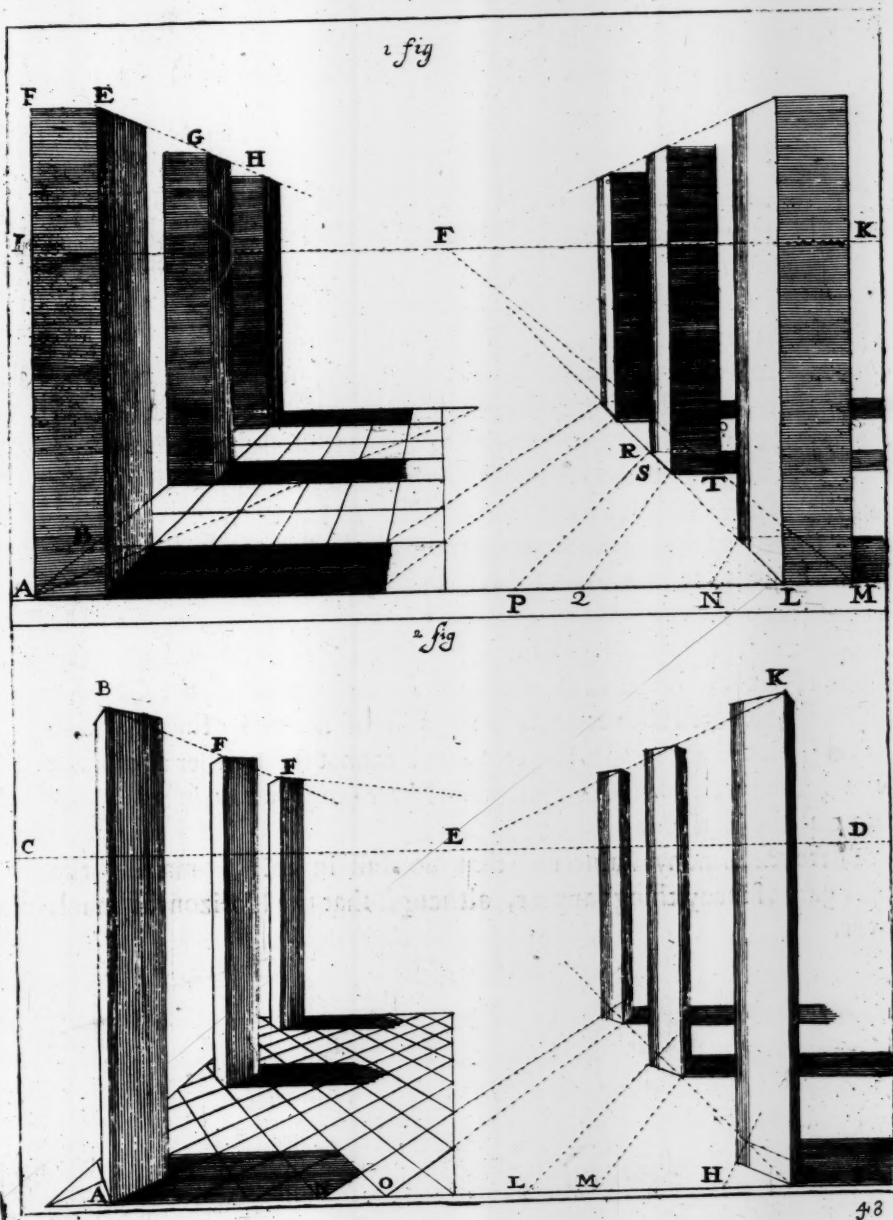
The Effects of the diversity of Horizons.

THE more that any one is Elevated above any Object, the more he difcovereth that which is above. By confequent, if one be lower, he fhall difcover lefs; and if one be under it, he can fee but that which is under, and nothing of that which is above.

The firft Propofition is verified by the firft Figure: The fecond, by the fecond: and the third, by the laft.

The firft and fecond Cube, is made as we have taught; the third is made alfo by the fame Orders, although they feem more hard, by reafon that we fee the Objects by the upper part. But if you turn up the Paper, or the Picture, and draw at the point of fight, and at the diftances B C, as in other Orders you fhall have the fame facility. I fet nothing of the Objects viewed on the fide: feeing that I have faid fo many times that it is the fame with thofe on the front: And for to give further knowledge how to fet them in order; There is one in a fingle draught, and the other fhadowed alfo.

Before we leave this third Figure; we muft obferve, that the lownefs of the Horizon, is the caufe that we fee the bottom of the Objects, which are elevated above, as D E F; and of the two others, which are G H, placed above the Horizon, one cannot fee neither above nor below. Above, becaufe the Horizon is lower; nor below, it being placed upon the Horizon.

There are many Painters, that do fail in this, making the upper part of many things appear, although that the Horizon be much lower.

1 fig

2 fig

Horizon

3 fig

E   D   F

G   H
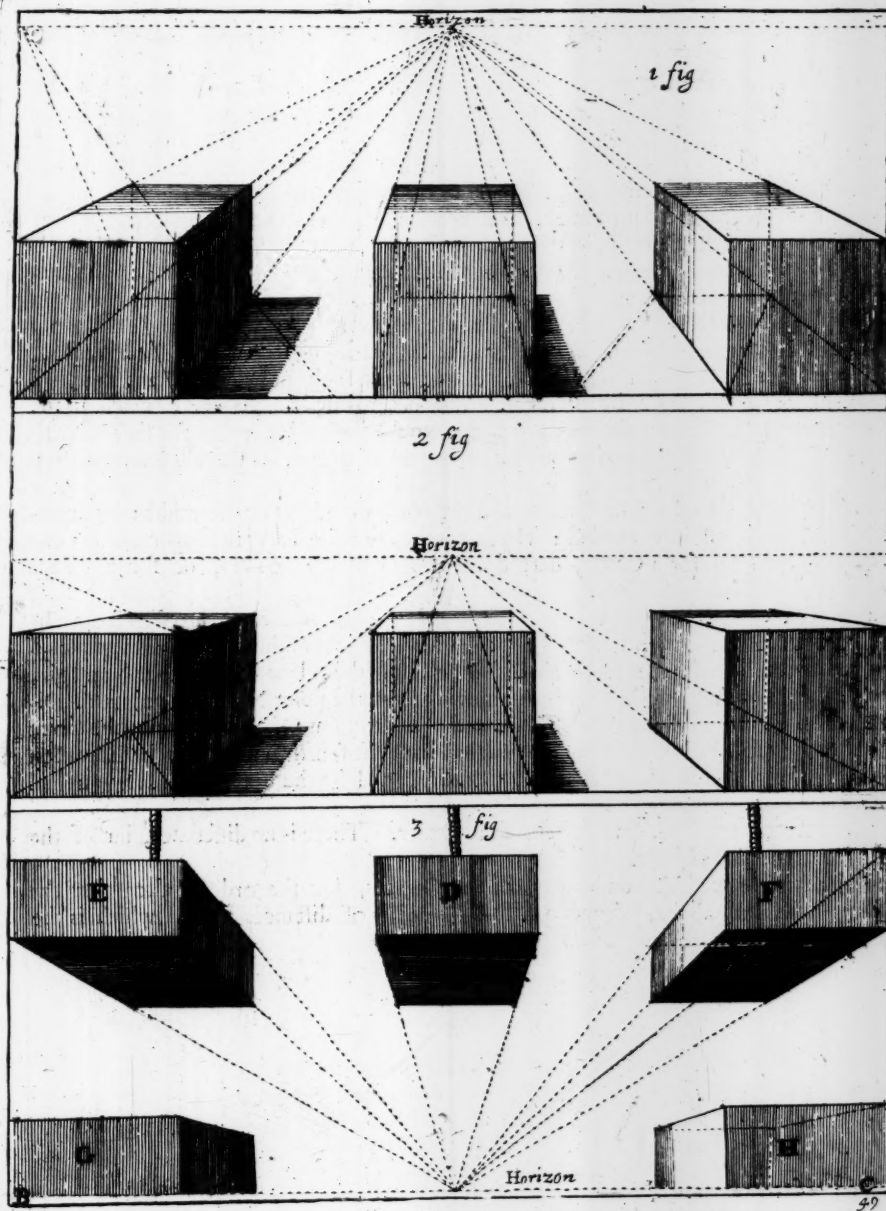
The Elevation of Objects viewed by the Angle.

WE have shewed by the two Figures of the 19 h. and 20th. fol. how the Planes are made, drawing to the points of distances, and never to the point of sight, if it be not for to finde the Diameter, We must keep the same rule for the Elevations, as it is easie to see by the first Figures; which have all their lines abutting at the points of distances B C, and not one at that of the sight A.

The first Figure D is for to shew, that whensoever there shall be an infiniteness of Parts, in one and the same Object viewed by the Angle, we must draw them all to the points of distances B and C. If you would make one of the same, see here the Order: Having made a Plane, and elevated occult Perpendiculars, as we have said, you must set the height that you would give unto it, at the first Angle E F, and draw from the point F to the points B C, for to have the height of the second and third Angle at the point G: Then from this point G, to draw again to the points B C, and you shall have the fourth Angle of the Platform. The other little Bodies are elevated in the same manner, by setting the height that one would give them, upon the first Perpendicular, as from F to H, and from H drawing to the points, as we said but now from the point F, we shall have the heights of all the Angles, And the points I K shall give the thicknesses of all the little Bodies, and the Platform of that of the midst: by drawing always to the Points B and C: The rest is seen sufficiently by the Figure, which one may make to serve for a Castle, defended with four square Towers, or for a Palace quartered with four Pavilions.

The two other Bodies which are on either side of the great one, are seen from the side, whereof the Order is alike to that which is seen from the front: for example, if you elevate Perpendiculars from all the Angles of the Plane L, and that you give your height to the first, as M N, by drawing from the point N, to the points of Distances B C, they will give the Angles 2 and 3 at the point O. Then from the point O, drawing still to the points B C, you shall have the fourth, which is the Elevation of the whole. This being practised by the first, and by the second Order you shall have the same.

The second Figure below is of the same Order. There is no difference, but of the Horizon, which is lower.

The third sheweth the under-part of the Objects, but the order is altogether the same with that above, drawing all to the points of distances Q R, which is the Horizontal line.

1.fig

2.fig

3.fig

Horizon
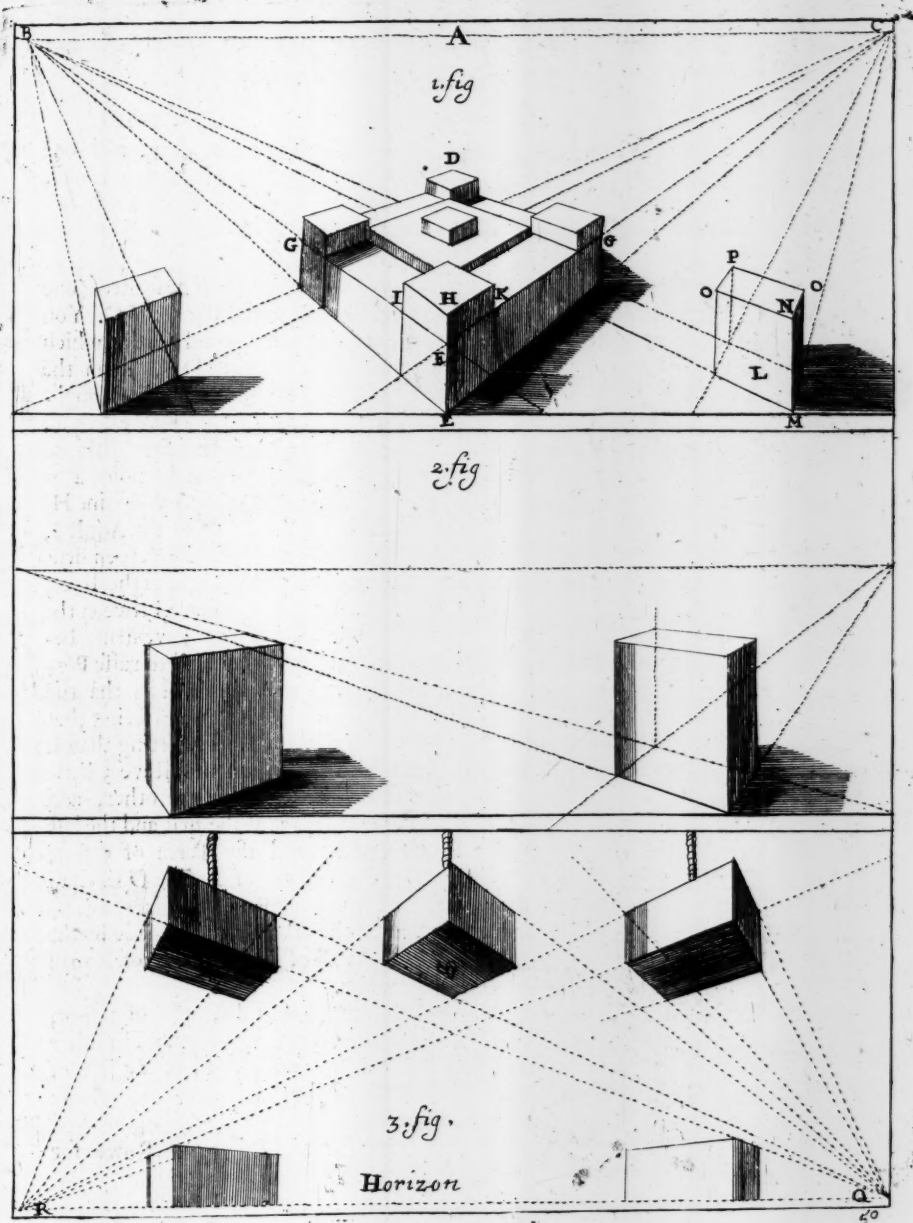
For to raise Bodies, and remove them as far off as one would.

IF you would have the first Body of two feet high, and one foot deep, and one broad, at two feet distance one from another, of two feet deep, of one foot broad, and three feet of height, and three feet distance. Another of one foot broad, five feet deep, and four feet high.

Thus you must proceed.

Having made a Plane of little squares, which we shall make to a foot square (one may make them of what size he will) by the points of sight A, and distances B C. You shall raise from the first Angle a Perpendicular, according to the second Order, which shall bear the Measures that you would give to the Objects as this D E, upon the which you shall transport four times the Measure D F, seeing that the highest ought to have but four feet. From all the Angles of this first little square F I G D, you must raise occult Perpendiculars. And having given the Measure to the first distance D and 2, because you would have it two feet high; you must draw from the point 2 to the point of sight A, and it shall divide the Perpendicule of the Angle G at the point H, you must draw Parallels to the base, which shall divide the Perpendicule of the Angle I, at the point K, and another Parallel from the point 2, which shall divide the Perpendicular of the Angle F, at the point L; And joyning these 4 points H K L 2, of right lines, you shall have your first Body. Then because you would give 2 feet of space, between the first and the second Body, you must leave two little squares of the Pavement between the one and the other body. and upon the first Angles of the third to raise Perpendicules, and to do all the same as at the first body, with these differences; that the height of this second, ought to be taken at the third point of the line D E, seeing that it must have three feet of height, and must containe two little squares, seeing that it must be of two feet deep. Between this second and the third Body, you must leave 3 little squares, seeing that you require it at three feet distance the one from the other, and from the first Angles of the fourth, to raise Perpendiculars as at the first and the last after 5 little squares, which is the depth of your body, and the Term of 5 feet, which the third Body ought to have of depth. The fourth point of the line D E, shall give to it, its height, which ought to be of 4 feet, by dividing the Perpendiculars, as you have done in the first. Those which are shadowed on the other side, are made by the same Order, and of the same Proportion; But the Wall of the midst is of Equall height four feet only, an Opening of 3 feet in the midst.

In the second figure is a Wall of equall heights. There being distances of 3 foot, left for doores or windows : The first part of the Wall is but 2 foot deep. The other two 3, foot in depth a peice, on the other side there is a Continued Wall of 14 feet of depth, and of height like unto the others.

The Order is the same with that of those above.

That which we have called a Wall, may also serve for an Hedge; or Rowes for Gardens.

Horizon

B · C

4 · E · 4

3 · 3

2 · H · 2

L · 1

I · G

F · D

Horizon

O ij.
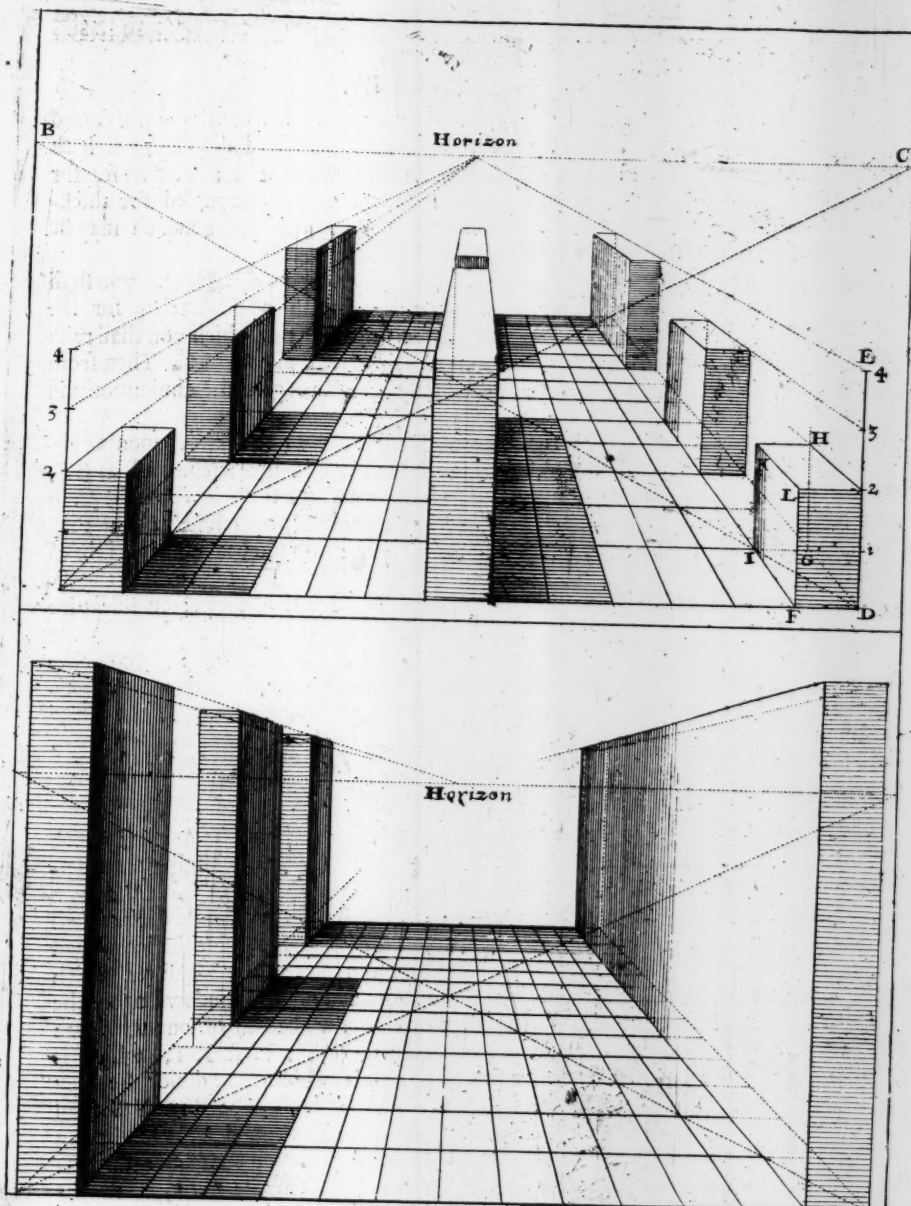
Of Walls viewed directly.

BY that which we have said, one may make all sorts of walls viewed obliquely. And although this very Order may serve for the same walls viewed directly, it hath seemed necessary to me to set also this figure, for two Reasons : The first, for that they do not always make Planes, and in this case one should be troubled for thicknesses. The second, for to give the thicknesses to the doors and windows which may be to be set in those walls.

For to make walls Parallel to the base, or to the Horizon upon the Plane, you shall give them such a length as you shall please, upon the Parallels to the Horizon ; for the bredth, you may take that of one little square, from the Angles of which you shall raise the Perpendicules A B, which you shall make as high as you shall please, as C. Then from the point C draw unto the point of sight D ; this Ray C D shall give the diminution and the perfection to the wall.

When one hath not a Plane, we must set at the first corner of the wall, upon a Parallel to the base, or to the Horizon, the thickness that we would give to the wall, as E F. Then from the point F to draw to the point of sight D, and from the point E to the point of distance G, from the section of these two lines at the point H, you must raise a Perpendicular ; and from the point F, another upon this last : you must take the height of the Wall F I. Then from the point I to draw to the point of sight D, for to have the diminution of the wall at the section of the Perpendicule H ; for the length, you shall give it such as you please, upon the first Parallel E F ; for the doors and windows in the same walls ; you must mark the bredth and height, as here K L M N ; and to set the thickness that you would give them upon a Parallel, above or below the doors or windows, at the nearest corner to the point of distance, as here N O, or L O. Then draw from the points L and N to the point of sight D ; and from the points O to the point of distance G. And from the section of the lines P, you must draw the thicknesses.

Another Wall viewed from the Angle.

HAving the Plane, you are only to raise Perpendicules from the Angles, which one hath resolved upon, and to mark the height, which one would give them upon the Perpendicule of the Angle that is nearest to you, as is Q R. And from the point R to draw to the points of distances S T. The sections which these lines shall make of the Perpendicules, elevated from the Angles of the Plane, shall give the length and the thickness of the wall : If you have not a Plane, you must sett the Measures which one would give, aswell to the bredth, depth of the doors and of the windows upon the base, as here V X is the bredth, X Y the depth, Z I the bredth of one window : Then to draw from all these points to the points of distances S T : First X T, which is the Radius of the base : Then from V T a small line occult, which shall divide the Ray X S at the point 5, which is the thickness of the wall. For the depth, the Ray Y S shall give it at the section that it shall make of that X T, at the point 6. and Z I, the bredth of the window at the points 7, 8. from which points X 5, 6, 7, 8. you must raise Perpendicules, and set above the first X the height 2. And drawing from the point 2 to the points S T, you shall have the height of all, at the sections of the Perpendicules, from the height of the window marked by 3, 4, draw to T, and where it shall divide the Perpendicules 7, 8, you must draw right lines : And from the Corners 9 to S, for the depth 10, at the point T, and from the section 11. to draw a line Perpendicular. All this may serve for a Pallisadoe as for a wall.
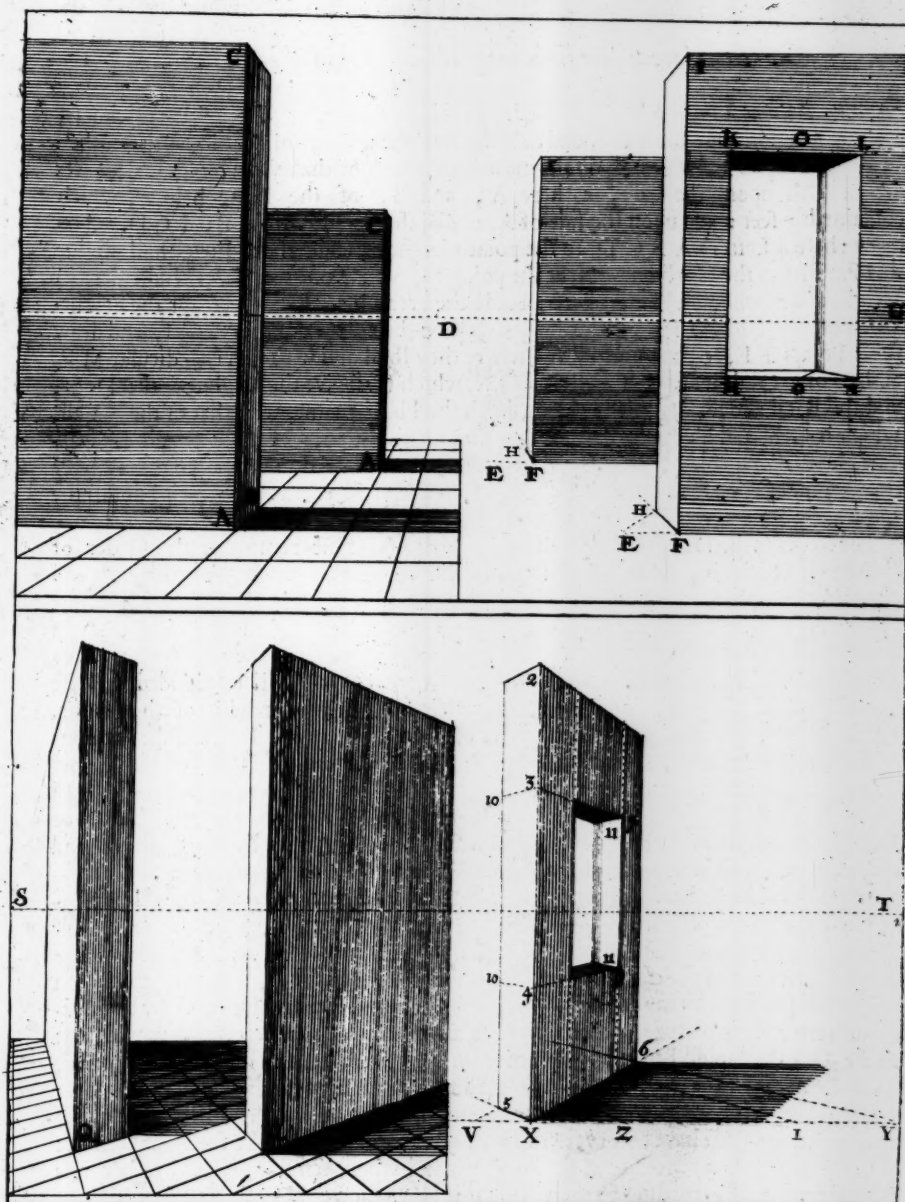
O iij.

For to place a door in what place one would of a Wall.

WE muſt raiſe a Wall, as we have ſaid, of 1, or 2, or of 3, feet thickneſs, upon the Points H I, and to bring it to the bottom of the ſame height, then if you know near upon the meaſure of the door that you would make; ſet the breadth upon the baſe, as here A, and B, of the Plane below, which containeth 3 feet: and upon the ſide of A, and B, the breadth of a Band C D. And draw theſe 4 Letters A B C D, to the point of ſight K, and where they ſhall divide this Parallel to the Horizon M N, at the point O, you muſt raiſe Perpendiculars of ſuch height as one would: ſee here already the breadth of the Door: for the height, you muſt tranſport D F E, of the Plane below to the Corner of the Wall I, and draw theſe Points F E, to the Point K, and where they ſhall divide the Perpendicular M P, at the Point Q, draw Q R, Parallel to M N, which ſhall give the height of the Door, and the Band above. Its thickneſs, or depth ſhall be the ſame, with that of the Wall, which is G F, and if you draw from the point G, to the point of ſight K, it will divide the Perpendicule M P, at the point S, draw S T, parallel to Q R, you ſhall have the bottom of the Door V, which is its thickneſs, and of the whole circuit of the Door.

For to make the Door to the Wall on the ſide; you muſt remember the Order of fol. 17. which is, that one ſet all the meaſures upon the baſe, and drawing from theſe meaſures to the point of diſtance, one hath all the abridgements that he deſireth. Example, you would have a Door 4 feet within the Chamber, you ſhall ſet 4 equal diſtances I C. Then draw to the point of diſtance L, the meaſures of the Door C A, and B D. And where the Ray I M, ſhall be divided by the points elevated of the Perpendiculars X Y, which ſhall give the breadth of the Door. For its height, you muſt draw to the point of ſight K, the points E F, and the ſections of the Perpendiculars X Y, ſhall give you it! For the thickneſs above and below you muſt draw the thickneſs the Wall G H, and F I to the point of ſight K; then drawing a little parallel to the baſe or to the Horizon, from the corner of the Door X, and as much from the corner above, you ſhall have X Z, the thickneſs above and below, which you muſt joyn with a Perpendicular, as you ſee in the figure.

If you would alſo have a Door on the other ſide, you have only to draw lines parallels to the baſe from the point X, to the Ray I N, and then to elevate them as we have ſaid, the reſt is the ſame with the ſide ſhadowed. The Door of the bottom is not in the midſt, that is to ſay, a foot and half; the which I have made on purpoſe for to reprove the error of thoſe, who without other meaſures, draw two Diagonals from their Picture, although it be of an enormous greatneſs, and would that all the Objects ſhould be equally diſtant from the ſection of theſe lines: that is to ſay, from the midſt of the Picture, ſo that according to their account, it ſhould be alwayes mounted for to ſee their work in its perfection, in which they deceive themſelves; for when a Picture ſhall have fourty foot of height, and that it ſhould be for to be ſeen ſet upon the Ground, we ſhould not ſet the Horizon higher then five feet, and rather leſs then more. And according to their Rule this Horizon would be twenty foot high.
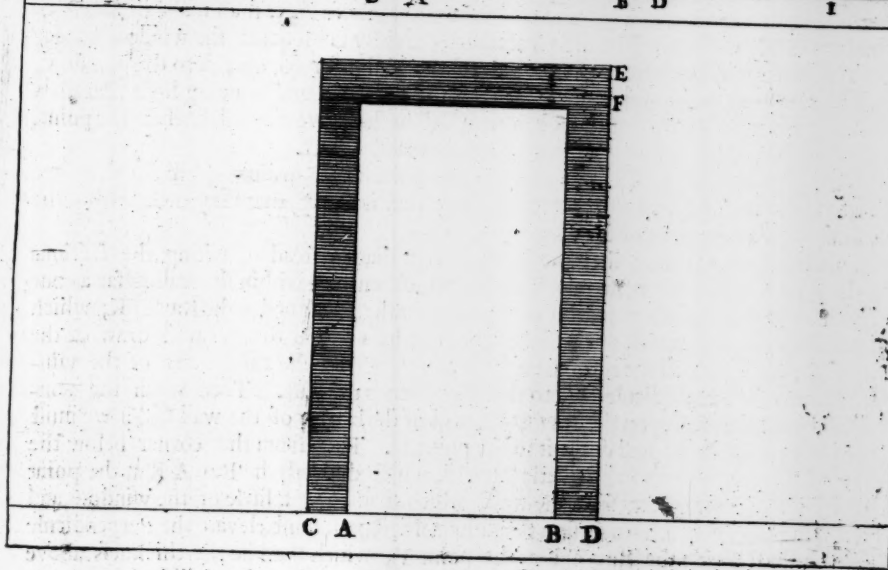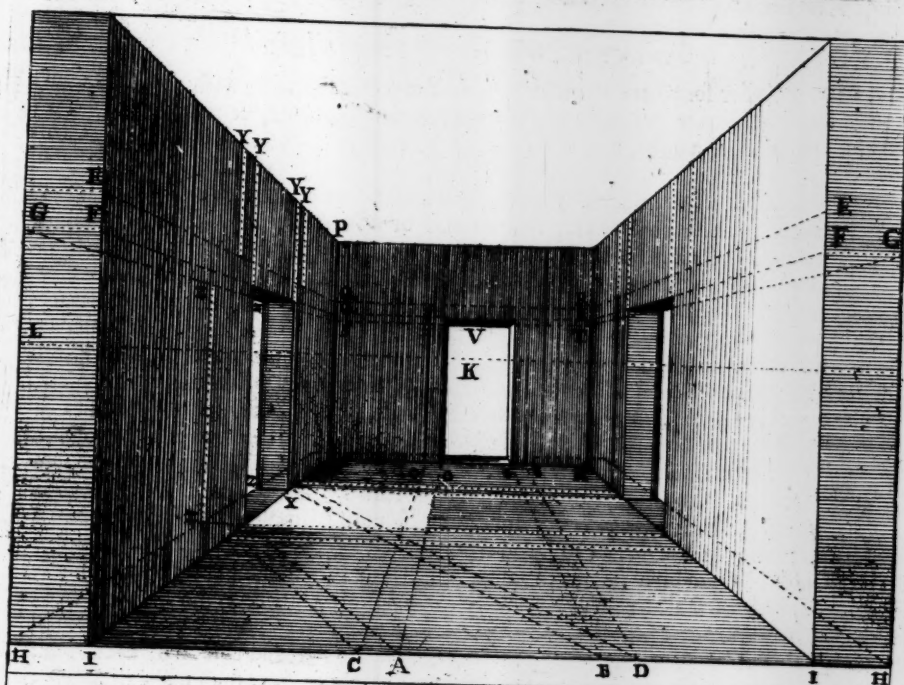
For to frame Windows in Perspective.

THE Order for to make a window, is altogether the same with that of a door, for if you make an Ascent or a Cross-bar within a door, it will be a window and no more a door, so that there is no more then to learn to make a single Cross or double, and you shall know to make windows. If you would make one in the wall A B of such largeness as you shall please ; you must set its measure upon the base, as D E, and draw from these points D E, to the point of distance F, and from the section which the points G shall make at the Ray A C, you must raise the Perpendicules G H, which shall give the bredth of the window, which is here but of two little squares : for the height, they make them ordinarily the nearest that they can to the Plancher above ; But, the Rest or Stay ought not to be higher then of three feet, or three feet and an half. Having then taken this Measure, you must set it upon the Perpendicular A B, as A I, and to draw I K. And where this line shall divide G H, that shall be the rest, a stay : And likewise drawing L, which is above to the point of sight K, the section of G H shall be the upper part of the window, the which will give us a long square, or Parallelogramma, to the which adding a Cross, it will be a window ; for to make this Cross-bar, you must divide the space D E into two equal parts. And at this division to give such a bredth as you shall please, ordinarily it is four inches, or at the most halfe a foot. And to draw this bredth M, to the point of distance F, and from the section of the Ray A C, to elevate the Perpendicules N O, which shallbe the ascent or Rising of the midst of the window for the Cross-bars, you shall set therein as many as you please ; there is nothing but to observe this, that they ought to have as much thickness as the rising pillar ; wherefore having taken this Measure M, you must transport it upon the Perpendicule A B, as is P, and draw this Measure to the point K, and the section that these Rays shall make of the Perpendiculars G H, G H, shall be the Cross-bars ; and by consequent the window made, for its thickness, it is not here but of the half of the wall ; for to give it to this window, you must draw lines occult from the point Q to the point K, and drawing little Parallels to the base, from the corners of the window S, they shall give the thickness at the point, that they shall divide the line Q X, as we have said of the door.

This window is equal with the wall within side which is not ordinary, because there are that make them with Chamfrettings or Scunches, that is to say, that they enter within the wall, sometimes a foot more or less.

The Order thereof is altogether the same, except that in stead of taking the sections upon the Ray A C K ; we must take it at that which entreth within the wall, as far as one would cause the windows to enter, as may be seen in the figure under the Ray O K, which receiveth the Measures which one hath set upon the base ; and that he must draw at the point of the distance F all the rest, as at those above, taking the thicknesses of the window, between the Perpendicule O unto that F, which is the last. Then when the window shall be all finished upon the Ray O K, and of the bredth of the wall O F, we must raise the Perpendicule A, and draw it to the point K. Then from the corner below the window to the points P, to make a little Parallel, which divideth the Ray A K at the point Q, which shall be the thickness of the wall, which shall cover a little of the window, and shall make the thickness R P to be seen from the point R, you must elevate the Perpendicule R V, which shall divide the Ray T K at the point V, which shall be the thickness above the window. Of the Measures of that, one shall make as much as they will, keeping therein always the same Order.

P.
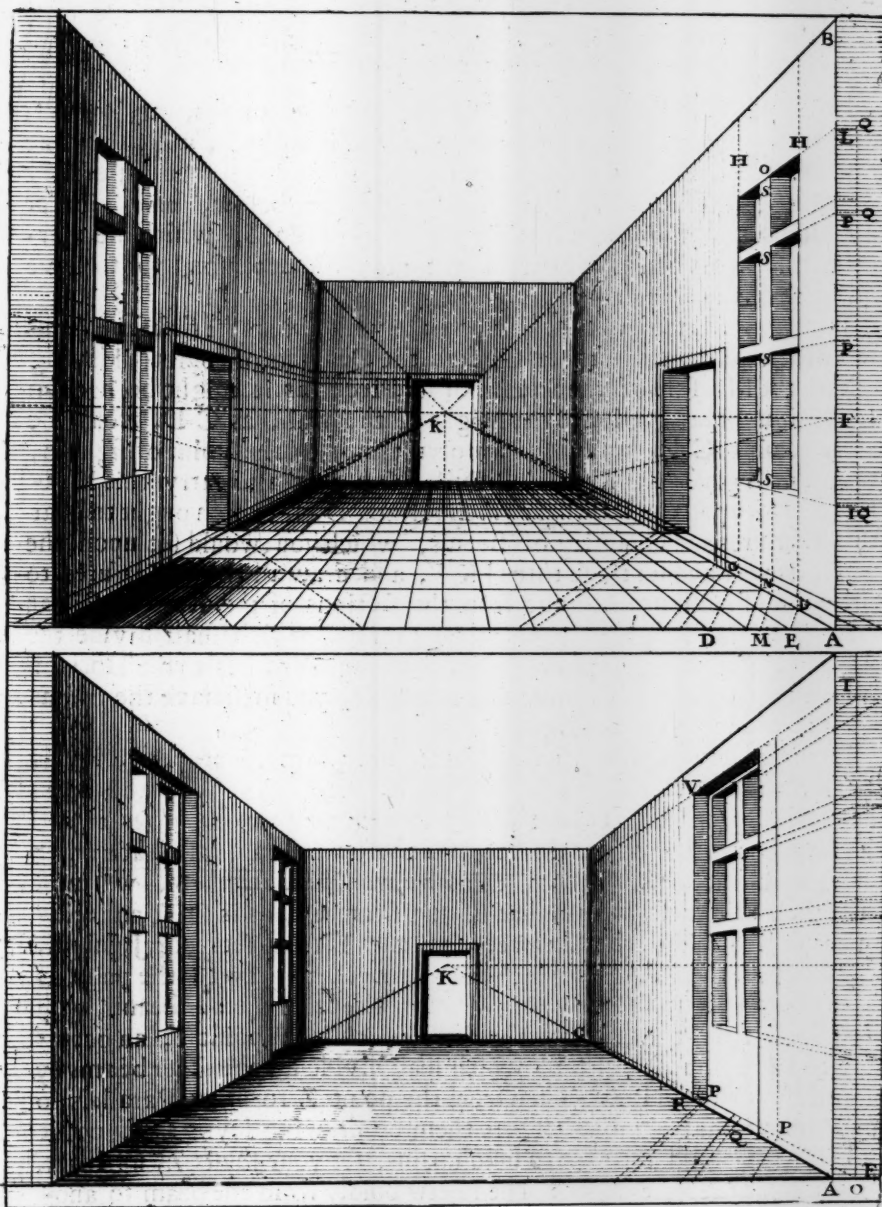
Of the Planchers above.

THE Perspectiff (or Practifer of this Art) ought, as it were, to follow the fame Order which the Mafons keep, which do raife and caufe to come forth from the Earth, by little and little, very fair Houfes.   The Pavement or Plancher below, ferve him for a Foundation, upon the which he raifeth the Walls, which he pierceth in fo many places as he will(yet not without reafon) for to have doors and windows, as we have faid.

Let the walls raifed be A B, upon the which we muft firft fet Beams or Girders, and upon thefe Girders the Quarters or Joyfts. Having taken the Meafure of the Square of its Piece (as it might be here on foot) it muft be carried to the height of the wall, as C D, from the which Points C D, we muft draw occult lines to the point of fight E, which fhall give the Rays C G D F. You muft alfo carry this Meafure C D, upon the Parallel to the Horizon D H, which ought to bear the Meafures and Quantity of Beams, which you would fet upon the wall, as we have fet thefe three I K L, and draw all thofe Meafures to the point of diftance M, and from the fections of the Ray D F, at the point O, to caufe Perpendiculars to fall, which fhall divide the Rayes C G, at the points P. Then drawing Parallels to the Horizon from the Points O and P, unto the other fide, you fhall have the Beams laid, as you fee in the firft figure.

Let us fet now Joyfts upon the Beams, or to do more properly, let us mortaife them there: The line Q R fhall ferve for the bafe, upon which you fhall fet your Joyfts, in fuch number, and fo near and far from each other as you fhall pleafe: thefe are diftant from each other twice their thicknefs. Then when as we would embox them, we muft take their thicknefs within that of the Beam QS, as is Q T, and draw an occult line T V; then between Q R and T Y, to fet your Joyfts X, and from all their Angles which may be feen, to draw to the point of fight Y; and that you may not pafs the half of the other beams, you muft draw from the midft of the firft, which is the point T, an occult Ray to the point of fight Y, which fhall divide all the other beams by the midft at the point Z. Then from the point Z to draw Parallels to the Horizon, that one may not pafs them by drawing Joyfts to the point Y. If you would not take fo much pains, fet your Joyfts Z, upon the line Q R, as they are under : Then draw boldly from one beam to another, from all the Angles X to the point Y, and you fhall have that you demand
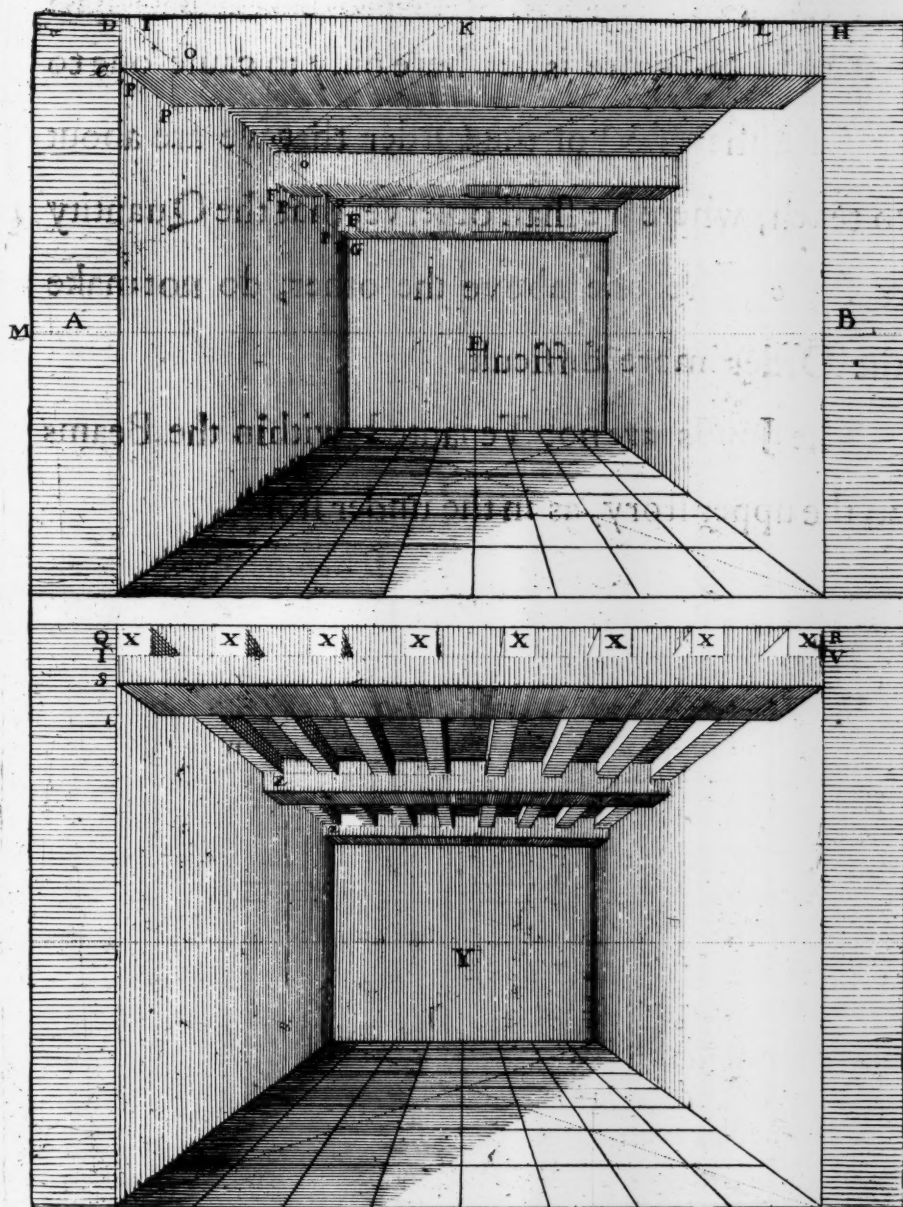
T H I S Figure is set here only to cause one to
see the effect of the Order that we are about
to teach, where we shall observe, that the Quantity
of stories, the one above the other, do not make
the Order more difficult.

The Joysts are not Tenanted within the Beams
in the upper story, as in the under story.

Piij
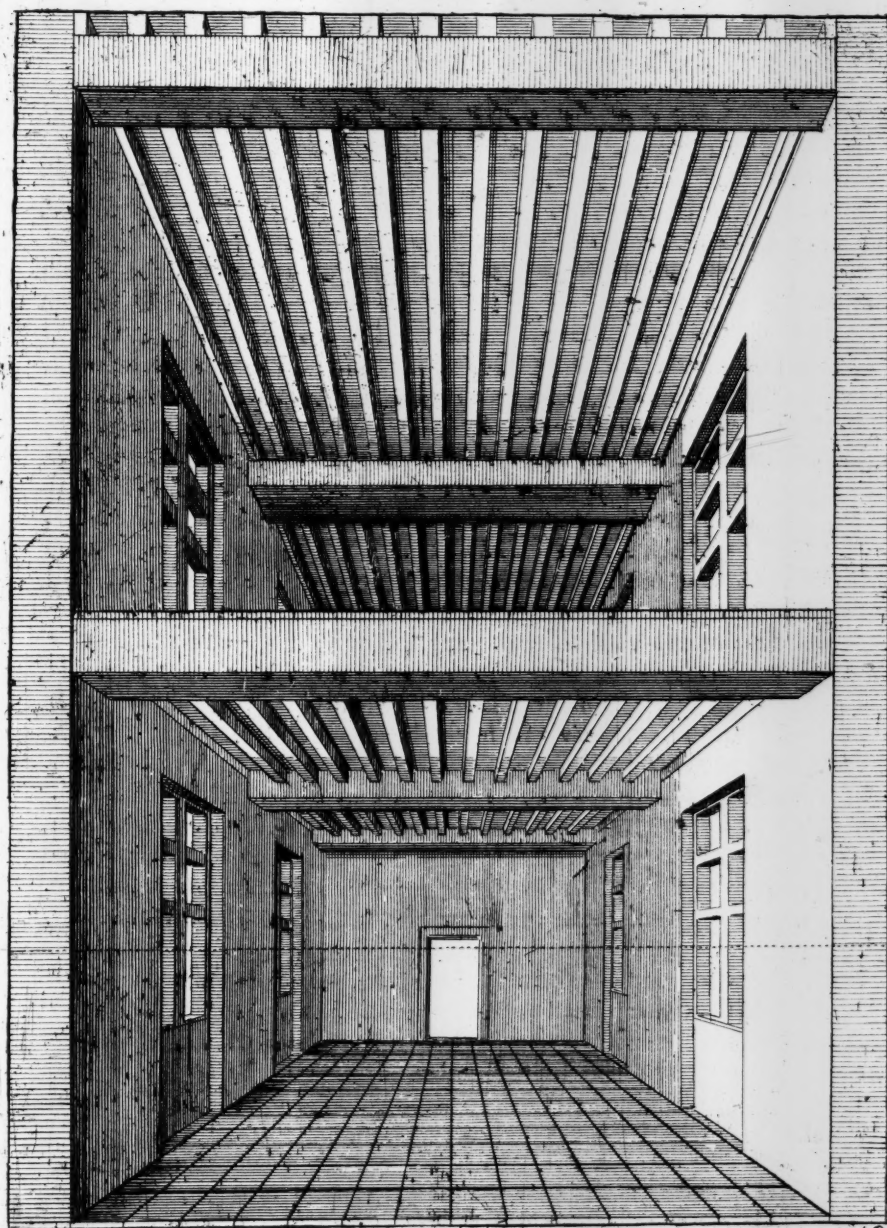
Another Ordering of Planchers in Perspective.

THIS fashion ought to be ordered in the same manner with that which we are now leaving : We ought only to change the setting of the Pieces ; that is to say, that we must set the beams at length, for to draw them to the point of sight. and the Joyst a cross, which is contrary to the other.

The Walls shall be A B, upon the which, or upon the Cattozes that come from them, you shall place the thickness of the beam C D, from the which points C D, you must draw Parallels to the Horizon C E D F, between the which one shall set such a number of beams as he will, as here three G H I, which he ought to draw to the point of sight K, and to take heed where the Ray D P shall divide the Perpendicular L P ; Then from the point P, to draw a little Parallel to the Horizon P M, which shall be the term or bound of the other Rays, as P N. And from the point N to raise a Perpendicule N O, and so to all the Pieces.

Here is that which is for the beams, for to set the Joysts across upon these beams, you must set their thickness upon the line Q R, and draw these Measures V, to the point of distance S, and from the section which the Angles V, shall make at the Ray Q T ; you must draw Parallels to the Horizon, unto above the beam of the other side. If you would mortaise them within the beams ; you must take the thickness of the Rafters within the beam, as is Q X. And from X to draw a Parallel to the base, unto the other side X X. And between these two lines Q R and X X, to set the divisions V, which shall be Y. And from all the points, to draw to the distance S, for to have the thicknesses of the side, and of below, which shall be taken in the section of the Ray X T, at the point Z, from which drawing Parallels to the Horizon, you shall make the Plancher, as is seen in the second figure.

You see how you must set into Perspective single Planchers of Carpenters work ; If yet after, or in the stead of those you would have some fair Plat-found of Pictures, or some other Compartiment ; follow that which we have said in the 35 fol. speaking of the Compartments of the Gardens, and you shall use the line Q R for the base. You may make there whatsoever it shall please you.

For the Planchers below, there are of some fashions in the folio's 30 31 32 33 and 34 of the Planes, for to give an open way to him that useth this Art to Invent others by. You may see hitherto, how to make any Halls or Chambers perfectly. We will teach the moveables at the end of this first part.
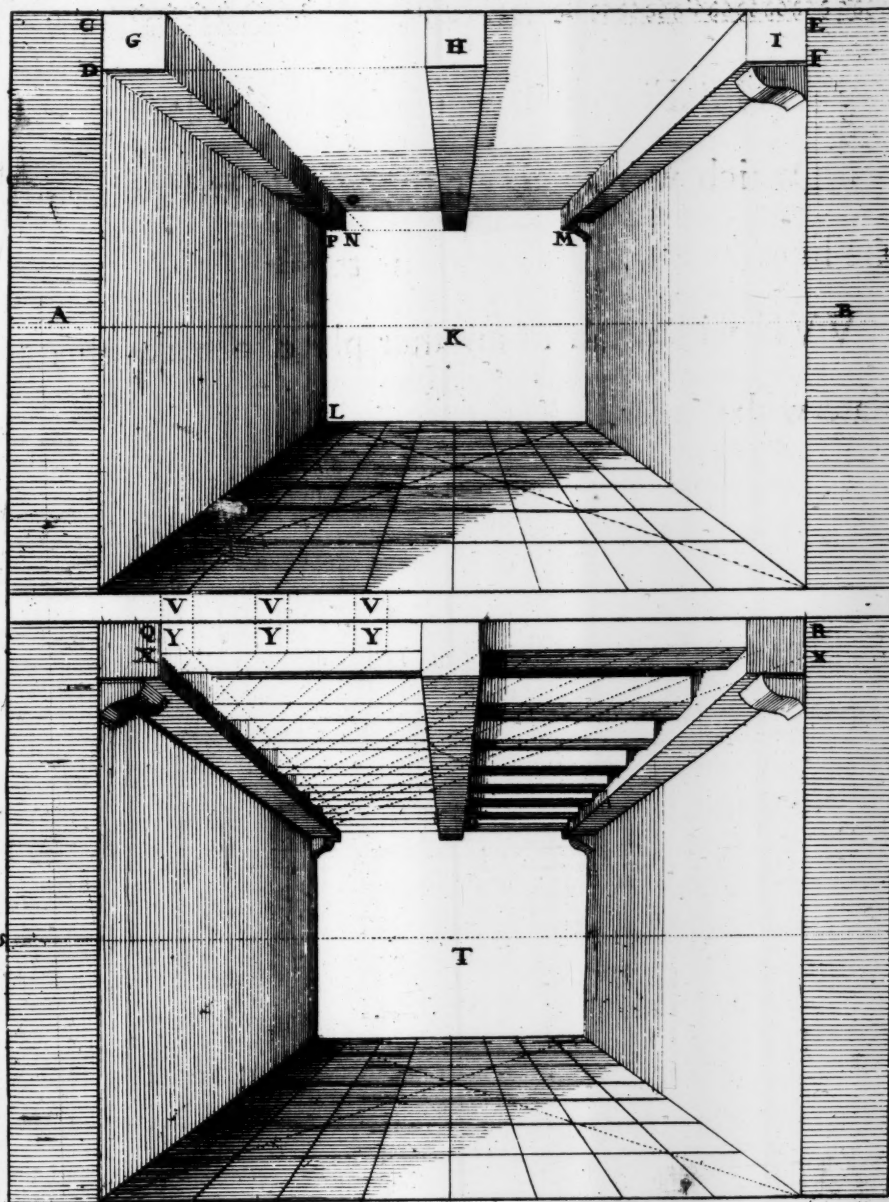
THIS Figure sheweth clearly the Plancher which we are about to express, and where the lines do make the Figure a little confused.

VVE will teach in another place to make this Gate with Panes.

Q

A single Draught of Doors and round Arches view'd directly.

Having spoken that which is necessary for Halls, Chambers, Windows and square Gates; We must now know how the round ones are made; for to set such where one would have them.

Supposing that A B C D E F were Pilasters, or small Pillars elevated upon some Plane; for to place there Arches, you must divide the bredth above G H, into two equal Parts, at the point I, upon the which having set one leg of the Compass, you shall make with the other a demi-round G H, which shall give the first Arch.

For to make all the others of the same height and bredth, you must draw lines from the points H G, to the point of sight K, and these two Rays shall divide the Perpendicules C D E F, at the points L, from the which points L, you must draw Parallels to G H, the which Parallels L L, you must divide into two, for to make there demi-rounds, as in the first. For to finde the Center of these Parallels L, there is but only to set the Rule to the first Center I, and to draw it to the point K, it will divide them all just at the midst M M, at the which points you shall set one leg of the Compass, and shall make the half-Circle as in the first. Those which are view'd in front, and those which are view'd on the side, are ordered in the same manner, as may be seen in the first Figure.

When one would make a thickness or a band equal throughout all, there is need but of one Center, as O, of which they have framed the thicknesses N P, of the figures below : All the rest is made, as we have said, drawing to the point of sight K : These two last figures shew how all kind of single Vaults, or bending Roofs should be made, which have but an half-round; One may enrich them, as we shall shew hereafter.

1. fig

G   I   H

M

L   L

M

L   L

K

G   I   H

M   L   L

E   F

C   D

A   B

E   F
C   D
A   B

2. fig

O   N P

K

O   P
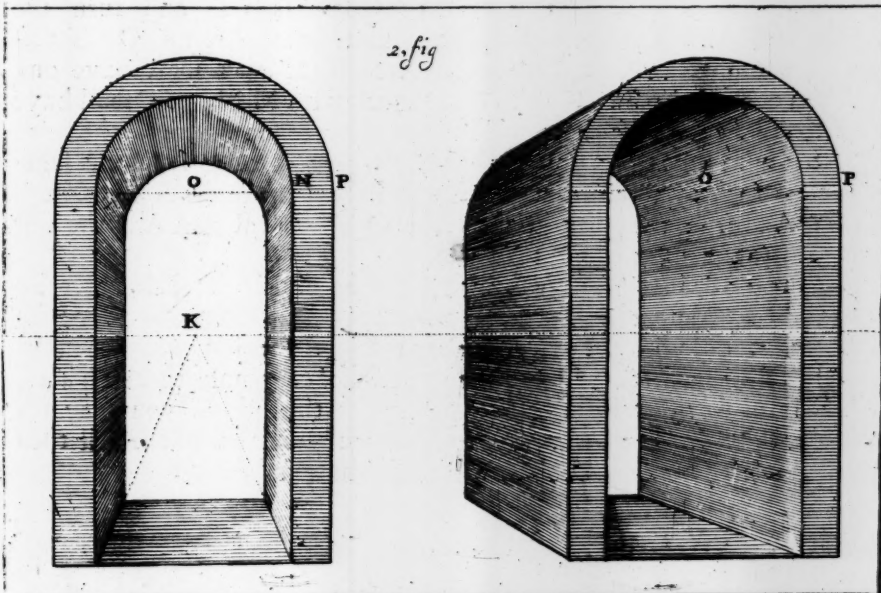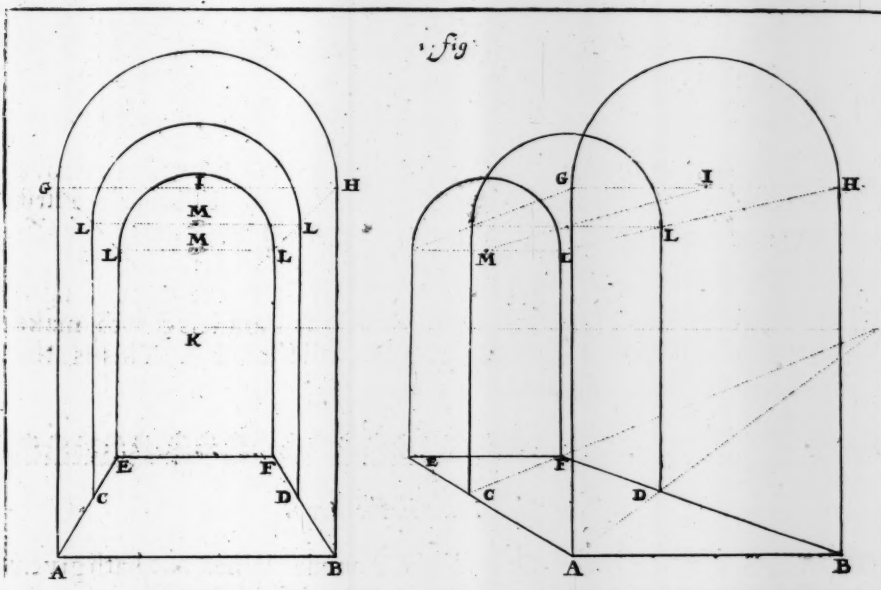
Round Arches above the Pilasters view'd directly.

THE single draught that we are about to pass from, giveth the means to make this, being the same Order, there are a few more draughts, and not more difficulties, for having drawn from above the Pilasters A B C D, Parallels to the base. We must divide the first into two, and from the center I, to make with a Compass the first half-Round A B, and without stirring it from the same center, to make the band A G F C: Then drawing from this center E, to the point of sight H, the Ray E H, will give all the Middles of the Parallels for to make half-Rounds above all, beginning at B D until the last I. This is the same order for that on the side.

Of the third Point in the Arch.

THE draught is as easie as of the Round: When one hath given the bredth, as K L, set a leg of the Compass in K, and turn the other towards O, which will frame the Arch L O, set again the compass in L, and make the Arch K O, you shall have one Arch in the third point K O L, do as much with M N, you shall have the second Arch of the bottom M P N: The second figure of the third Point is with a Band or Border about it, which is made from the same Center; for example, from the Center R, they make the Arch S X and T V: And from the point S, the Arch Q V, and R X. All the rest draweth to the point of sight Y.

The true third Point is the Figure ✠, they divide the Diameter _a b_ into three equal Parts, then they set one leg of the Compass in one division as _c_, and with the other leg they take the opening _c b_, for to make the Arch _b e_: then setting again the compass in _d_, they make the Arch _d a e_, which is an Arch in the third point as well as the other, you may use which you will. The Ancient Churches come nearer to the first then the second: there are also some which are more close.
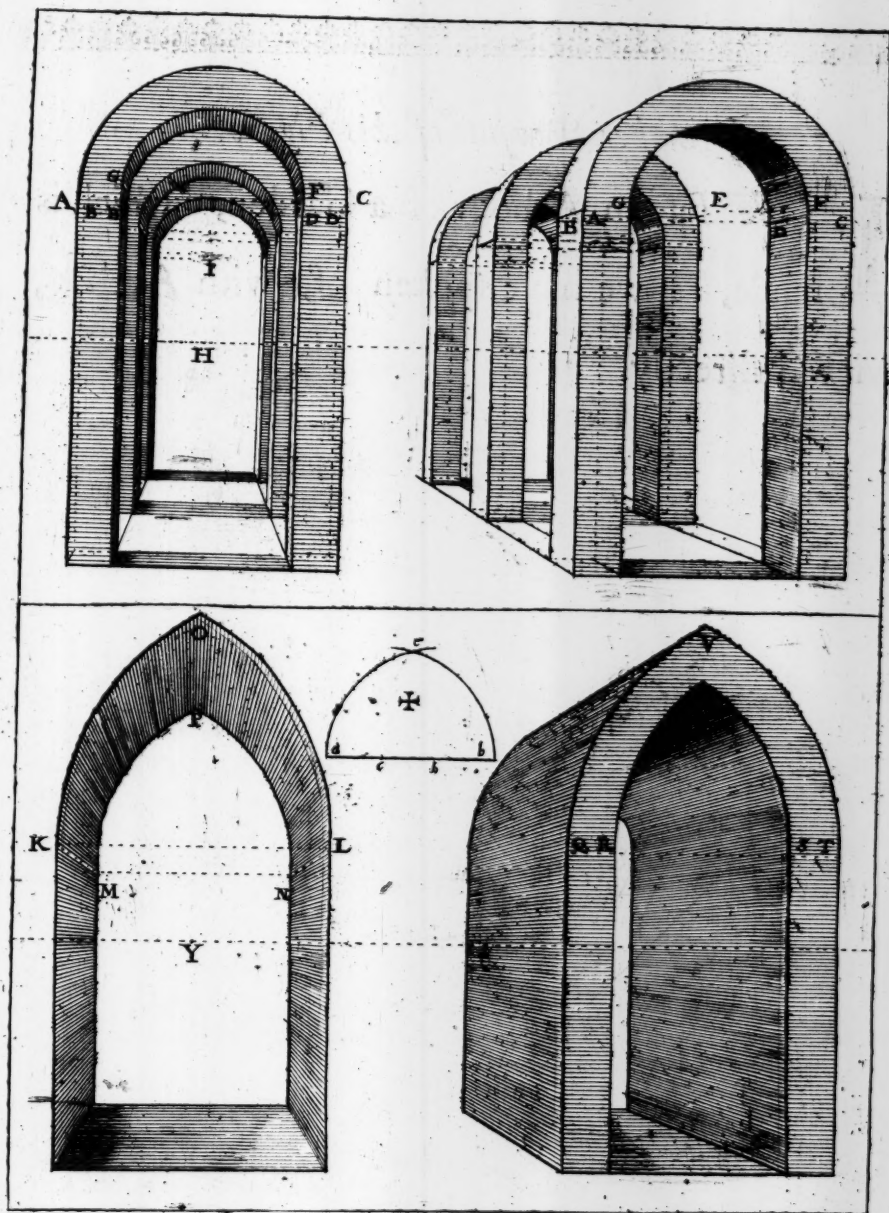
A further Pursuit of this Figure.

I Have set an Arbour of a Garden, which is made, as we have spoken of, with Arches, view'd directly.

For to frame and set into Perspective Doors and round Arches.

THE Round being hard to set into Perspective, hath need of lines and of points which go before it, ere it can be framed: And for to finde these points the more easily, we must understand the first figure, by the which we see, that he which would have a demi-round upon the Diameter A B, hath only to set a leg of the Compass at the midst of A B, at the point C, and with the other leg of the Compass to draw a crooked line from A to B, and so to carry his demi-round upon the Elevation D E, for to have a Door or round Arch, as in the second Figure, so as we have said.

But for to set it into Perspective, we are to divide it into as many Parts as we will: the more that one can make is always the best, as we have said and shewed at the 28th. fol. and as we shall shew, speaking of cross vaulted Roofs. We will divide this into eight Parts only, four for the half: Having made the half Circle, as we have said, we must upon the demi-round draw a Parallel to A B, which toucheth it at the point F, and this point F shall be the midst above the Circle: Then to elevate from A B two Perpendiculars, which divide this Parallel F, at the points G H. And from the Corners A B G H, to draw two Diagonals A H G B, which shall divide themselves in I, and from this point I, to elevate a Perpendicule C I F, which shall divide the Circle into two, and the Diagonals shall divide it into two other Parts at the points K, by the which we must draw a Parallel to the base K L. Let us transport all these divisions and measures upon the third Figure, for to set them into Perspective.

First, draw the Corner E to the point of sight M: Then from the point N equal to D E at the point of distance P, which shall divide the Ray E M, at the point Q. Whereby E Q will be the bredth of the first Arch D E, in Perspective. Draw also O to the point P, it will divide the second Arch at the Ray E M, or point R, not having more space upon the base for to take the third Arch, you must draw from the point N to the point of sight M; and from the point R a Parallel to the base R S. Seeing that R S is under the same Angle with E N, it is then of the same bredth as we have proved from the beginning: Drawing then from S to P, it will divide the Ray E M, at the point T, which shall be the third Arch.

We must then elevate the Perpendiculars V, from these three Points Q R T, the which shall be divided by the Ray H M, which shall be the highest of the Arches. Then from the Ray B M, which shall give the lower part of the demi-round, draw Diagonals from the points B V H X, which crossing themselves, shall give the place of the Perpendicular Y F, which divideth the Arch into two: And drawing the Ray L M, it shall divide the Diagonals into two, and the Arch into four. If you joyn these points B Z F Z K, with crooked lines, you shall have the first Arch, and the means to make an infinite Company of the same fashion. This Order serveth for Vaults, Arches, Doors, Bridges, and every other thing that requireth the demi-round. And therefore I let alone making the two others, speaking no more.

This Order may also serve for the Windows of a Church; There is nothing else to do, but to make one or two Ascents, to fasten the Glass.

1 fig.

2 fig.

3 fig.

R
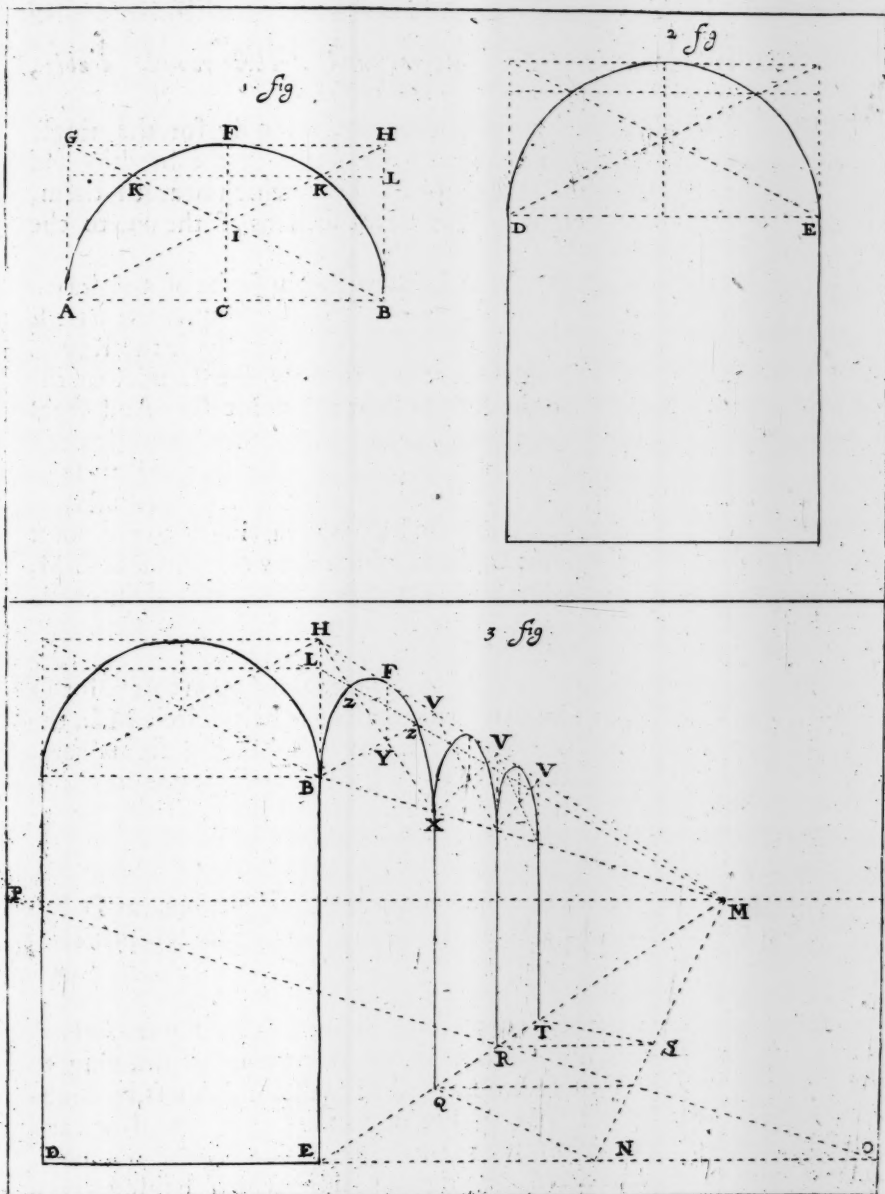
For to frame and put into Perspective Doors, and Arches round, double, shewing their thicknesses.

THAT which we are about to say, is only for the single draught, the which being doubled, giveth the bredths and thicknesses of the Arches, and of that which beareth them, joyning thereto right lines at all the sections of the one to the other ; as for example.

Having made the first draught D E, as we newly spoke of, and drawn D E to the point of sight A, we must set the thickness upon the base E C, by drawing C to the point of distance B, it will divide the Ray C A at the point F, and from this point F, to draw the Parallel to the base G F, which shall divide the Ray D A at the point G. And from F and G which shall be the thicknesses, to elevate the Perpendicules I F G : If from the point H, you shall draw to the point A, this Ray shall give the height of the Perpendicular H I, upon the which you must take the line of the Center of the demi-round K, by drawing K to the point A, which shall give the point L, from which draw the Parallel L M, and this Parallel shall be the line which must bear the center of the demi-round behinde : As N, is the line of the center of the demi-circle before : you must divide this line M L, into two equal parts, by drawing from the point N, to the point A, by the point O, and upon this point O you must set a leg of the Compass, and make the half-Circle M L, the which shall be divided as the first, as we have said in the figure foregoing ; then to draw right lines from the divisions of the one to the other ; that is to say, from the demi-round before to that behind, for of the two to make but one. as the figure sheweth it, joyning M to P Q, to R S F to T V, to X L, to K.

or to make the Arches or round doors seen on the front, as D E F G, there is no need to make all these divisions, seeing that it is sufficient to have found the line M L, for to make the demi-round, which is carried again to the first N P K. But I have made them there on purpose, for fear of confounding the letters with the lines in this Figure below, where the Arches are view'd obliquely, or at return, by drawing to the point of the sight Y, these Arches shall give their thickness, by doubling the order, which we have spoken of in the figure preceding, and joyning the division from the one to the other, as we spake but now, and the which is seen in this second figure : to the which having given the thickness E Z, I have framed the draught E of points, and Z of full lines, thereby to avoid confusion: and to make to understand, that all that which is made of Points ought not to be seen, the Picture being finished.

R ij.
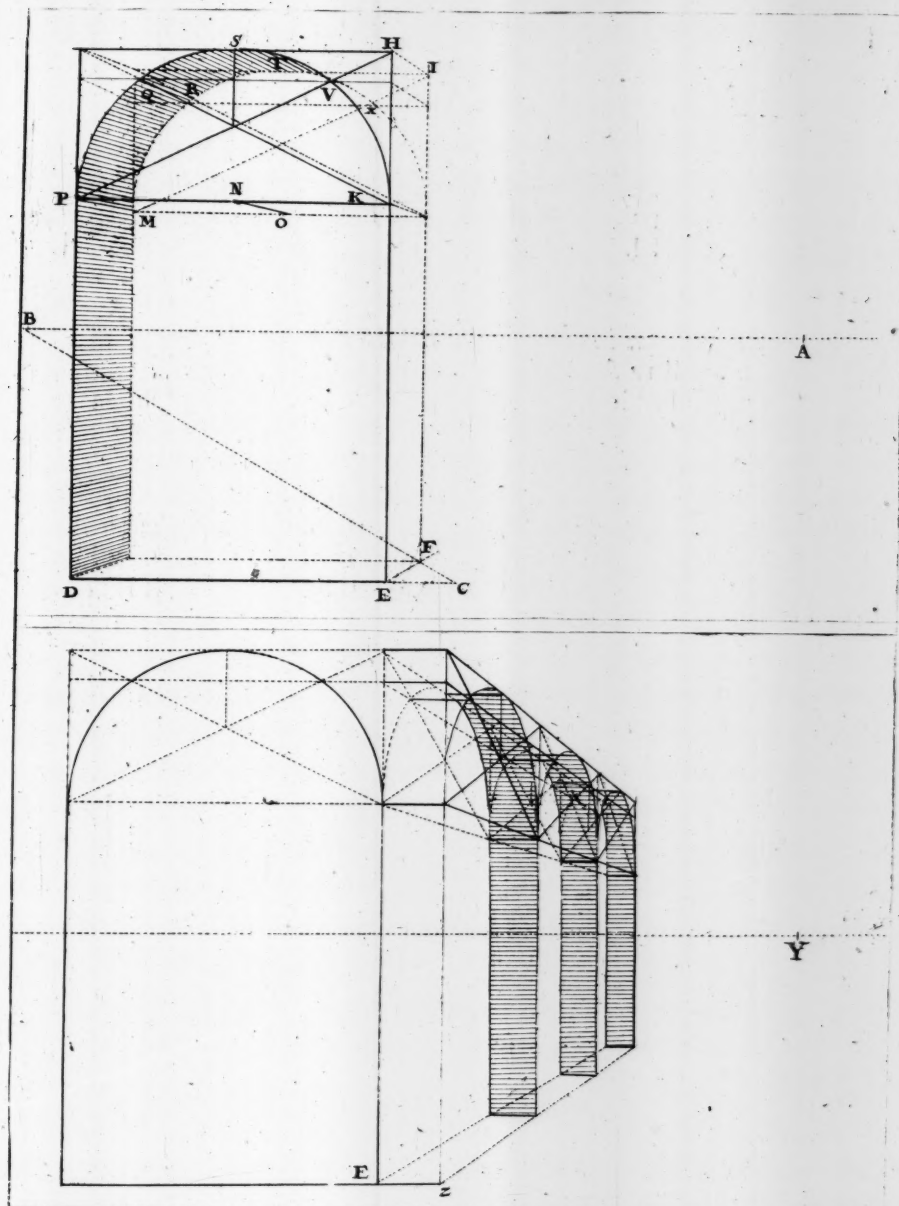
Of Figures in Arches of another fashion.

THE Arches view'd in front, that we have set heretofore, are
made exactly: but they are somewhat long in the Practice.
Behold another fashion as right, and more short then the other.
　　Having made from the Center A the demi-round, or the
whole Circle B H I. You must from the Center A, and from the end
of the Diameter B, draw Rays to the point of sight C, then set upon
B I the bredth or thickness that you would give, as is D A. And from
this point D to draw to the distance E, and at the section of this line
D E, upon the Ray A C to the point F, you must draw a Parallel to
the base, until that it divide the Ray B C, at the point G, then to set
one leg of the Compass at the point F, and with the other leg to take
the distance G, for to make the demi-round or the whole round, which
shall be the thickness of the Arch, or of the Round, as may be seen
in the Figures. All the lines K, ought to be drawn at the Center A, and
the other L, at the point of sight C. This may serve for round windows
made of stone; and these lines shall make the points, as also for great
Vessels, Pipes, bathing Tubs, &c.

Arches view'd obliquely in Perspective.

THis Order may serve when one shall be in haste, and that one
would not be so exact, and also to avoid a multitude of lines,
which the other Order doth oblige to make.
　　I say then, that having framed the first Arch N O, as we have
said heretofore, we must make upon the first draught little Parallels to
the base, in such number as you shall please, as are these Q; then to take
with a Compass the bredth, where the Arch beginneth, as is P O, and
to bring it upon all these little Parallels Q, which shall give the points
R, by the which we shall bring a crooked line, which shall frame the
thickness of the Arch.
　　It is certain, that according to Perspective, the Objects are enlarged,
when they come near to us, and that the line O P ought to be smaller:
but in this, the difference of these bredths is so small, that it signifies no-
thing. And yet I give not this for a Rule, but for an ease to those that
are in haste.
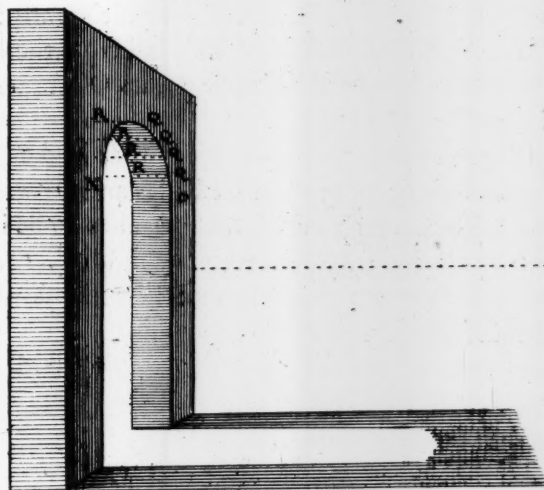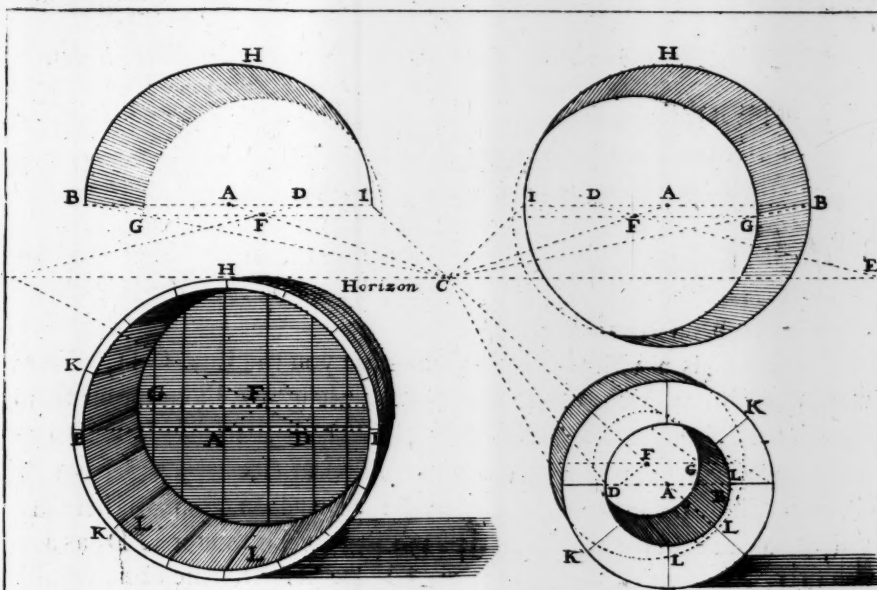
Of Arches flat, or in manner of an Handle of a Basket, or demi-circles.

THE Order to set them into Perspective, is the same with the de-
mi-Round, and of the third points, as we see in the Figure A B.
All the difficulty is to finde the draught which is made in two
Manners.

The first, by two centers, and a line or thread, as we have said in
the Orders before speaking of the Oval, by reason that the Handle of
a basket is properly an half-oval.

The second is practised thus: If one give you the line C D, for to
make there a low Arch, which may have the height E F: you must from
the center F, make the demi-round C G D, and to divide it into as
many equal Parts as one would, as this here into twelve; and from all
those divisions to draw to the Center F: then again from all these di-
visions to draw Perpendiculars upon the line, or Diameter C D, as are
the lines L. After these works, we must of the height, which one would
have the Arch of, make also a circle, as from E F, the demi-round H E
K; and from the sections which this little circle shall make upon the
divisions of the great, we must draw little Parallels, until that they touch
the Plumb-lines, or Perpendiculars, which fall from the same divisions:
as for example L O, and from all these points O, frame the Arch, as
we see it here made of Points.

The other Figure maketh yet the Arch lower, and one might make
it yet more couching, keeping the same Rules and Orders.

The Figure below maketh one of these Arches to be in Perspective,
view'd in front, as it ought to appear, being finished. *I* will set nothing
of the Practice, having already said, that it is the same with that of
the demi-Rounds.

❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀

ONE may see in this Figure the good effect of the Arches, when one giveth them well the Center, or the draught of the Roundness that they ought to have,

For the Degrees and the Figures we shall have here after the manner of giving them their just Measures.
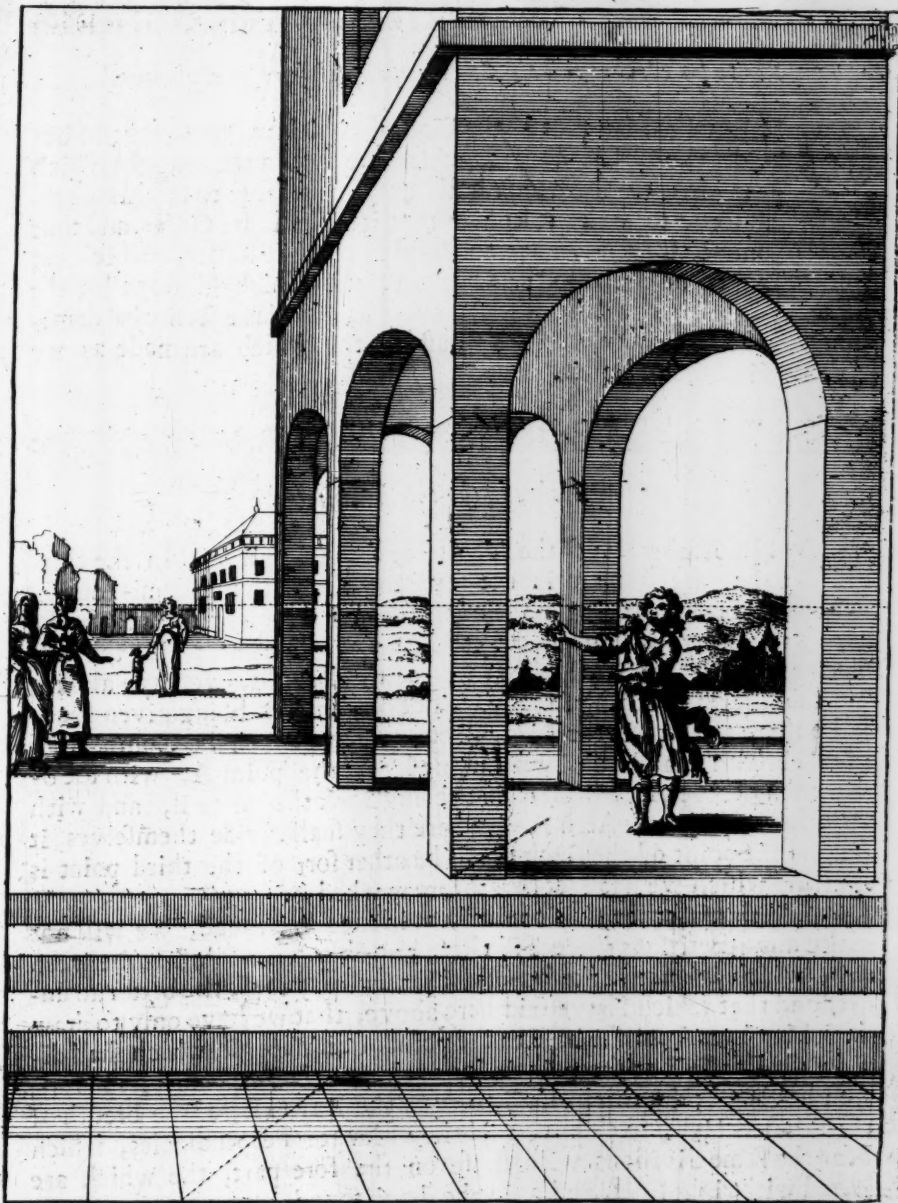
S.

For to set Arches or half-Circles upon Pilasters or Columns.

ONE might say that in the Figure, which we are about to behold, there are Pilasters, which are not in the draught which goeth before, the which hath made me resolve to set this here, which shall serve to make it known that it is the same Order, and that we have only to leave the place and bredth of the Pilaster, which we would give them between two Arches, the which is done by the means of the Plane or of the Base, even as we have seen the demirounds, which are between each Pilaster, the which are made as we have said in the last Order.

Arches in the third Point.

THE Arches, and the Vaults or bending Roofs in the third point, are ordered in the same manner with the demi-round; wherefore, having made one of them, we may very well make the other: it sufficeth only to know the draught, seeing that the Figure sheweth sufficiently the rest; for the draught, we have already said that there is nothing so easie. The bredth A B being given for to make there an Arch in the third point; we must open the Compass for all this bredth; and holding firm one leg at the point A, with the other to make the Arch B C, then to bring back the leg to B, and with the other to make the Arch A C, where they shall divide themselves, it shall be the point of the Arch C: The other sort of the third point is the true, which we have set heretofore marked ✠

Seeing that all the rest is ordered, as in the demi-round, we will not make any repetitions thereof: there are only here Pilasters between two, which are not in the others, that we may cause the better to understand that which I have said here above, that we have only to draw these Measures from the base to the point of distance O, which shall divide the Ray D E at the point F, for to elevate the Perpendicules before: then having set the thickness G, to draw the Ray G E, for the bredth of the Pilasters H, from this point H they elevate Perpendicules, which bear the same divisions with those on the fore-part, the which are joyn'd with right lines, and as in the demi-round.
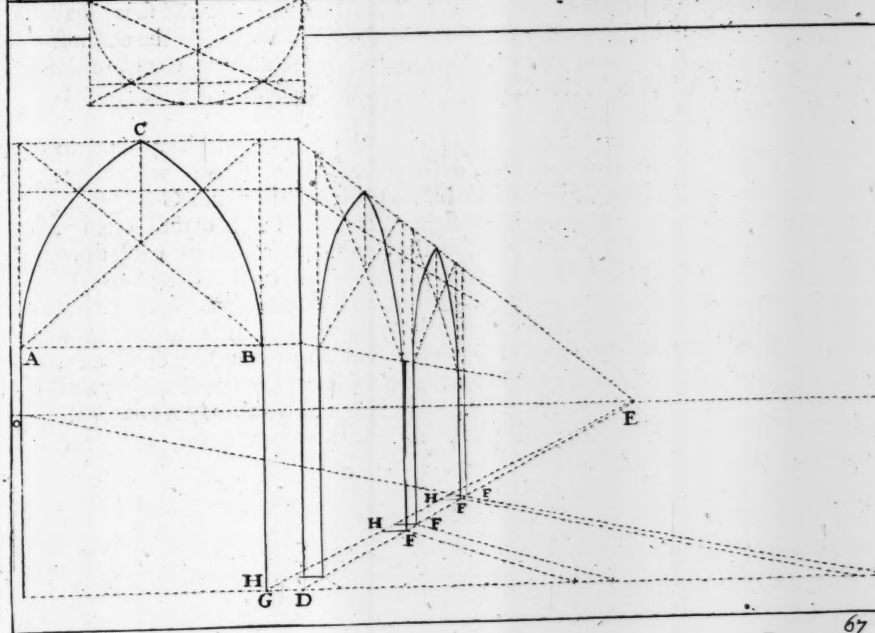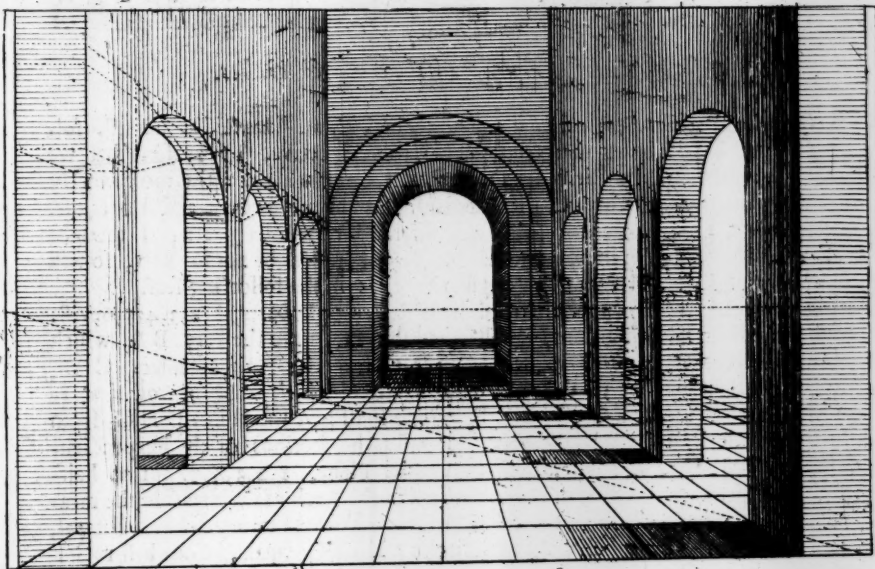
For to set into Perspective Vaults or Cross Arches.

WE must remember, or see it anew, that which we have said at the 28. fol. speaking of setting the great Round into Perspective, by reason that we have divided the Circle into many Parts, for to make it the most exactly that may be, and by consequence the Vaults or Arches more round and more just. But as there are a great Company of lines in this division of 16 parts ; I thought that it would be better to begin by a division of 8, although it be not so exact, so will it also be less confused. We will take again the other in the following leaf.

Having then made the Plane of a Round divided into eight parts, 1,2,3,4,5,6,7,8. We must draw from all its divisions, Parallels to the base, unto the Ray B A, which shall give the points C, upon the which we must elevate the Perpendiculars C D ; We must transport upon the first Perpendicular B and D, which is the line of elevation, the Measures of the half-Circle B E F, which shall give the points D H G; from the which we must draw Rays to the point A, and at the sections of the Perpendiculars C D, we shall have the same divisions as in the Plane, 1,2,3,4,5. for an half-Circle we must draw crooked lines, as may be seen in the Arch of the first side, the measures of which we must transport to the other for to have the two Arches collateral, from the risings of which we shall make two Circles with the Compass, the one before G K from the Center M ; the other at the bottom 5 L, from the Center N, and so we shall have the four Arches, which do meet ordinarily in the cross Vaults, at the outmost Mouldings, Ogees or Circlets; There remaineth nothing but to make the Cross, or the crooked Diagonals, which ought to rest and bear upon the corners G, 5 K L, passing by the knot or scutcheon O.

Seeing that the Circle is divided into eight Parts, the Arches which are but the half of the Circle, ought to have but four, as have those of the sides : whence we ought also to divide into four the half-Circle before G K, at the points G P Q R K, the which ought to be drawn to the point of sight A, unto the Circle of the bottom 5, L ; Now that which followeth, is the secret of the Cross ; it is that we must draw Parallels to the Horizon, or to the base, from all the sections of the Circle on the side 1,2,3,4,5. at the divisions of the Circle before, in such manner as G, which is the first division of the Circle, touch in a point the first section 1. from 2 to draw a Parallel to the second division P, and to make a point S, from 3 to the third division Q, which shall give O, the place of the Knot ; from 4 to the fourth division R at the point T, then to joyn the crooked lines G S O T L, and you shall have already a Diagonal, and do as much on the other side, and you shall have the Cross entire, and your Vault compleat.
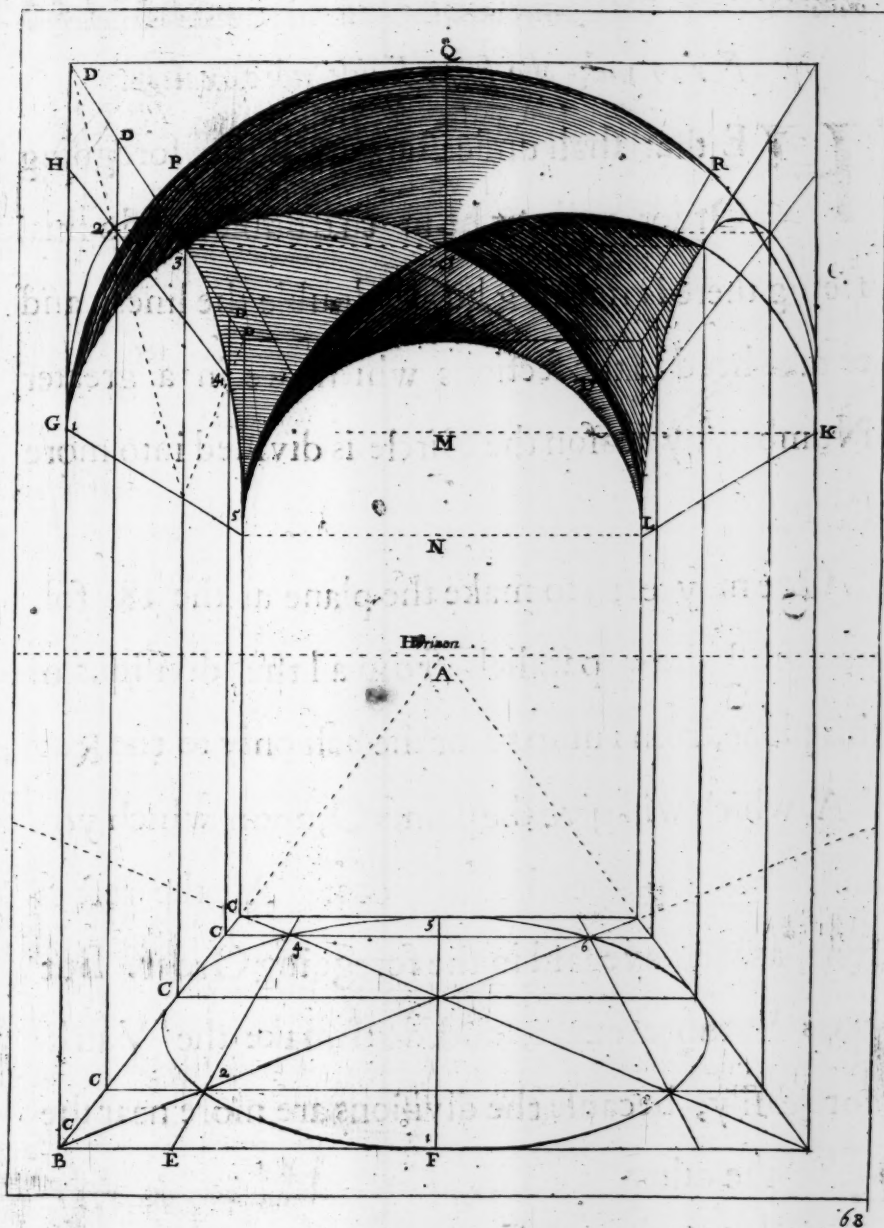
For to make the same Vault more exactly.

HE that shall understand well the foregoing Order, will not be much troubled to do this, seeing there is nothing but to double the lines, and to take heed to the sections which are in a greater Number, by reason the Circle is divided into more Pàrts.

One may learn to make the plane at the 28. fol. you must draw parallels from all the divisions of this plane, from i unto 16. or the half only to the Ray B A, which will give the points O, upon which you must elevate perpendiculars, &c. All the rest is done, as we have said in the foregoing Order. But this is the more exact, and doth make the Vault more easily, because the divisions are more near the one to the other.
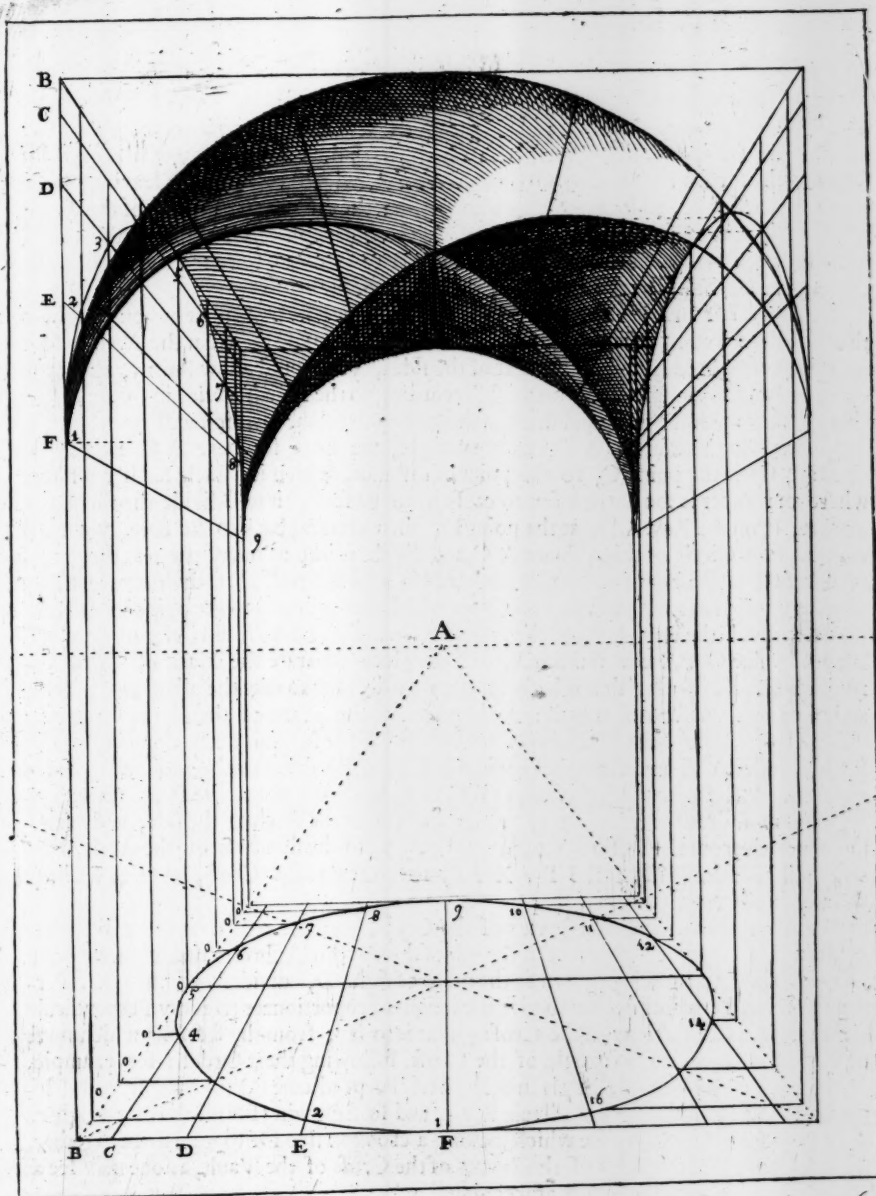
For to make the Vaults more streight then large.

THere are two Orders in this Figure; the one for to streighten the Vaults on the sides, the other for to give a Thickness to the Cross. We will begin with the former. The two Orders of Vaults, which we are about leaving, supposing that they are all square; that is to say, that the distance and bredth of the Arches is equal, as well on the sides as those on the front; and he that cannot make but of this fashion, shall finde some trouble, if he were to set up a Church, where ordinarily the Arches of the sides are much closer then those of the front.

See here a fair Invention, by the which you shall give such Measure as you please, to those of the sides, by the means of the base A Q. Suppose then that the Arch before it Q, is 40 feet broad, and that in that of the sides, you would allow but 15, 20, or so much or little as you please : you must (according to the fourth advice in fol.17.) set this Measure upon the base, and draw to the point of distance, which will give the sinking of the same Measure in A E; as by example, we have set here A C of 20 feet, drawing from the point C; to the point of distance, which is a little farther off here where our Paper is too narrow for to cause it to be seen; it will divide the sinking of 20 feet, upon the Ray A D, at the point E; then coming back to the Base, you must make an half-Circle of this distance A C, and divide it into as many parts as the greater Arcade F G shall have of division, as here 8; and from all these divisions I, to elevate Perpendiculars I H, and from the points I H, being drawn to the point of distance they will divide the Ray A E, at the point O, which you must also elevate into the Perpendicular O P, you must make in some place separate the Plane of this demi-round F G. Supposing that it hath not been made, for to take the divisions thereof, and to carry them from E unto B : And seeing that the Plane of the Figure foregoing is equal to F G, take the Measures of the half B C D E F, and carry them upon the Perpendicules A F, and from these points E F D C B, draw to the point of sight D, and from the sections which these Rays B C D E F, shall make at the Perpendicules O P; you must draw crooked lines, which shall frame the Arch of the side, and drawing Parallels from the sections 1,2,3,4,5,6,7,8,9, to the divisions of the Arch F G, you shall have the points F R S T V X Y Z, for to frame the Cross, even as we have already said heretofore.

For the Thicknesses of the Joynts of the Cross, you are only to make a little line of Elevation *a b*, which I have set at the top of the Perpendicule elevated from the point O : and this line *a b* being drawn to the point of sight D, divideth all the other Perpendicules at the points *c d*, for to give the heights Proportionate to every Perpendicule elevated from the sections of the Cross; that is to say, from the sections which must be made for to finde the draught of the Cross, following their Order : for example, the first Elevation *a b* shall be given at the first Perpendicule G : The second Elevation *c d*, at the second Perpendicule F, *c* ; and so following for all the others, which shall give the points C; by the which making a crooked line for to joyn them together, we shall have the thickness of the Joynts of the Cross of the Vault, as one may see at half of the left side of the Figure aforegoing.

Horizon
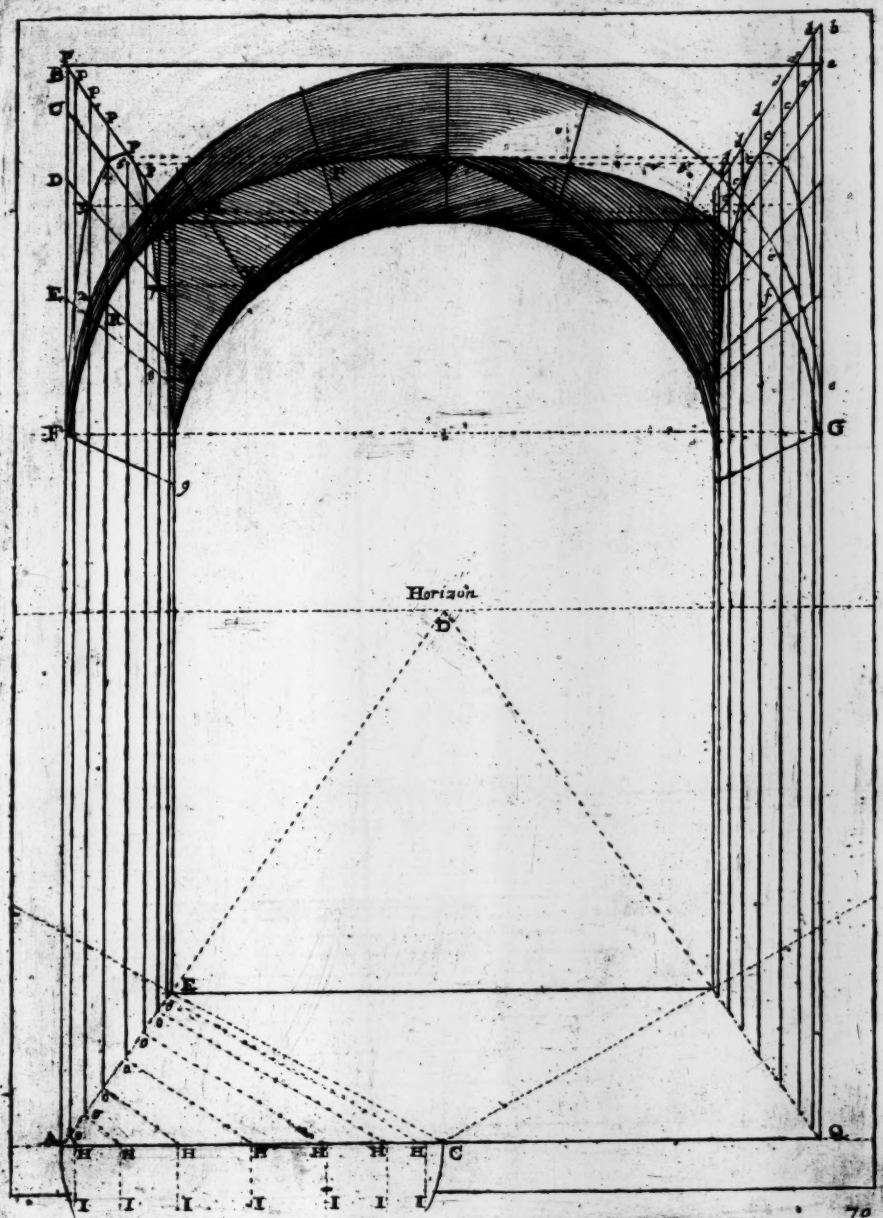
T.

A *Vault made by the Orders aforegoing.*

ALL the Orders aforegoing, do shew suffi-
cient easiness for to make a perfect Vault, as
this here: except what concerneth the Pillars or Co-
lumns, which we will shew hereafter.

❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀
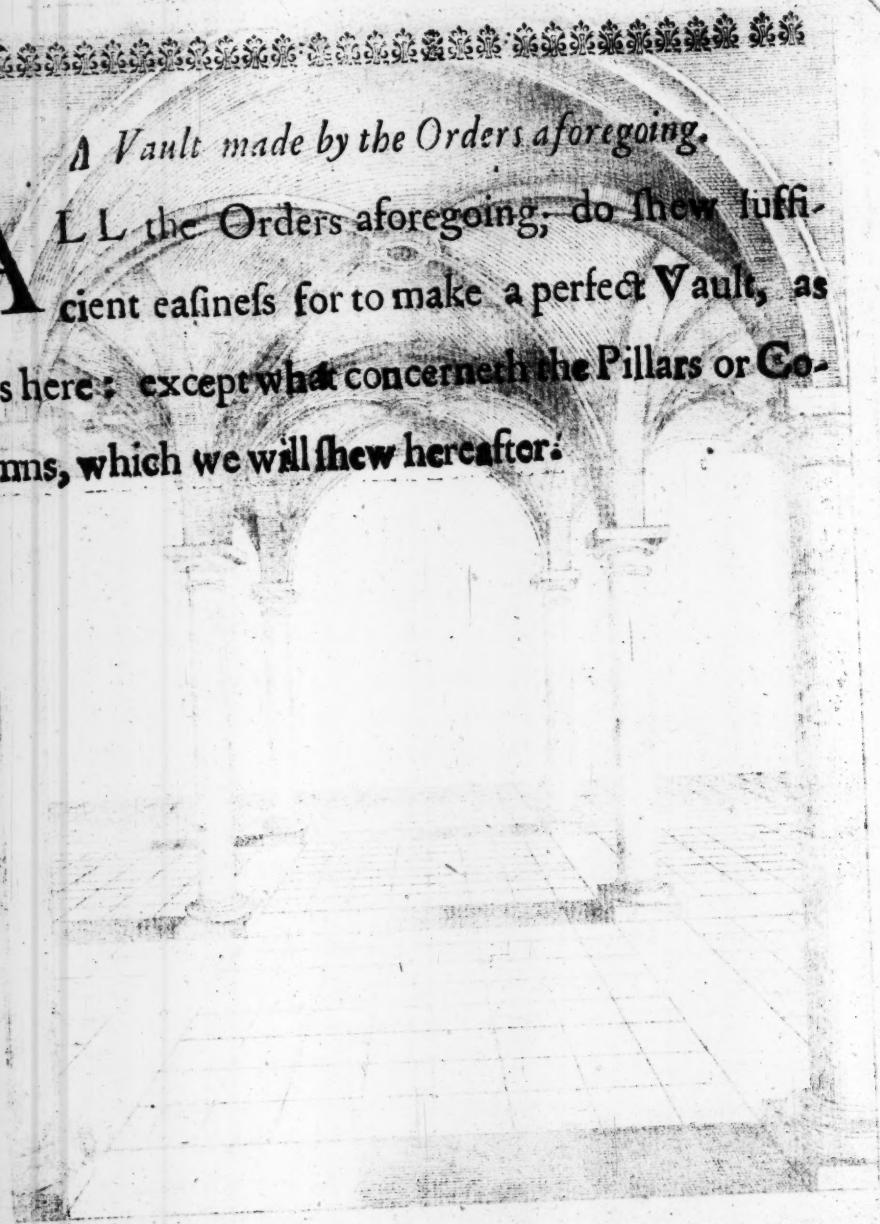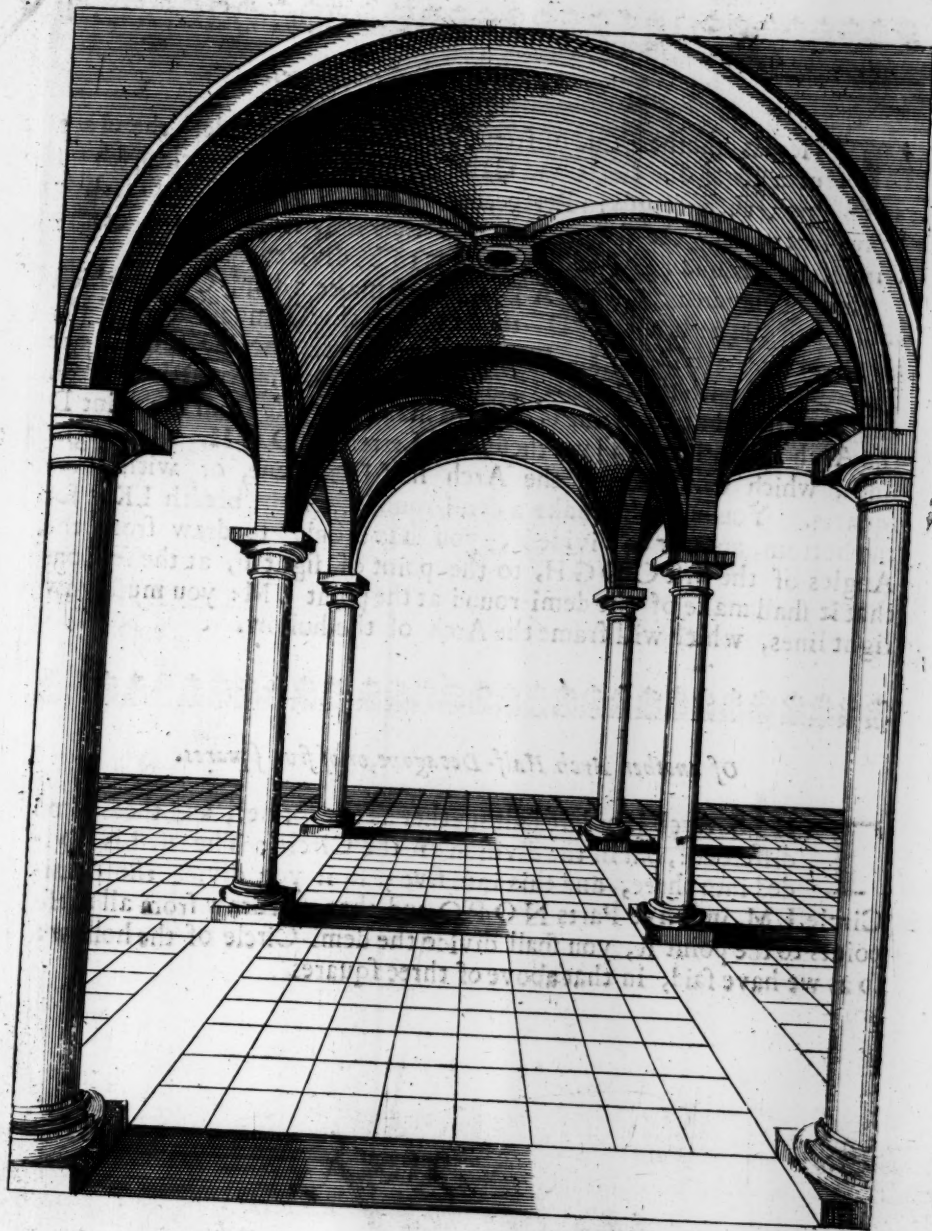
Of Arches and Doors with three squares.

THere is another kind of fretted cieling, which holdeth the place
of a Roof for Gates and Galleries, and also in Churches, which
maketh well also in Perspective; and is very easie to practise:
I have set it after the Round, because that it is framed of a demi-
Circle, as a round door, which after is to be divided.

Having elevated the walls A B, we must make a demi-Circle, which
containeth all the bredth C D, then holding the Compass open of the
bredth of the half-Diameter E C, you must hold one leg firm at the
point C, and with the other E to draw an Arch on high, which divideth
the demi-round at the point G, and to make likewise from the point D
the Arch E H. Then to joyn these four Letters C D G H, with right
lines, which will give you the Arch half-Hexagone, or with three
squares. You must also make a demi-round, upon the bredth I K: for
the bottom, and for to divide it, you have only to draw from the
Angles of the first C D G H, to the point of sight F, at the sections
that it shall make of the demi-round at the point L M: you must draw
right lines, which will frame the Arch of the hollow.

❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀

Of another Arch Half-Decagone, or of five squares.

THIS Arch is ordered altogether as the former, and there is no
difference, but in the division of the Circle: The first is divi-
ded into three, and this into five; so if you divide the demi-
Circle L M, into five Parts N O P Q, and that you draw from all these
points to the point R, you shall divide the demi-Circle of the hollow:
so as we have said, in that above of three squares.
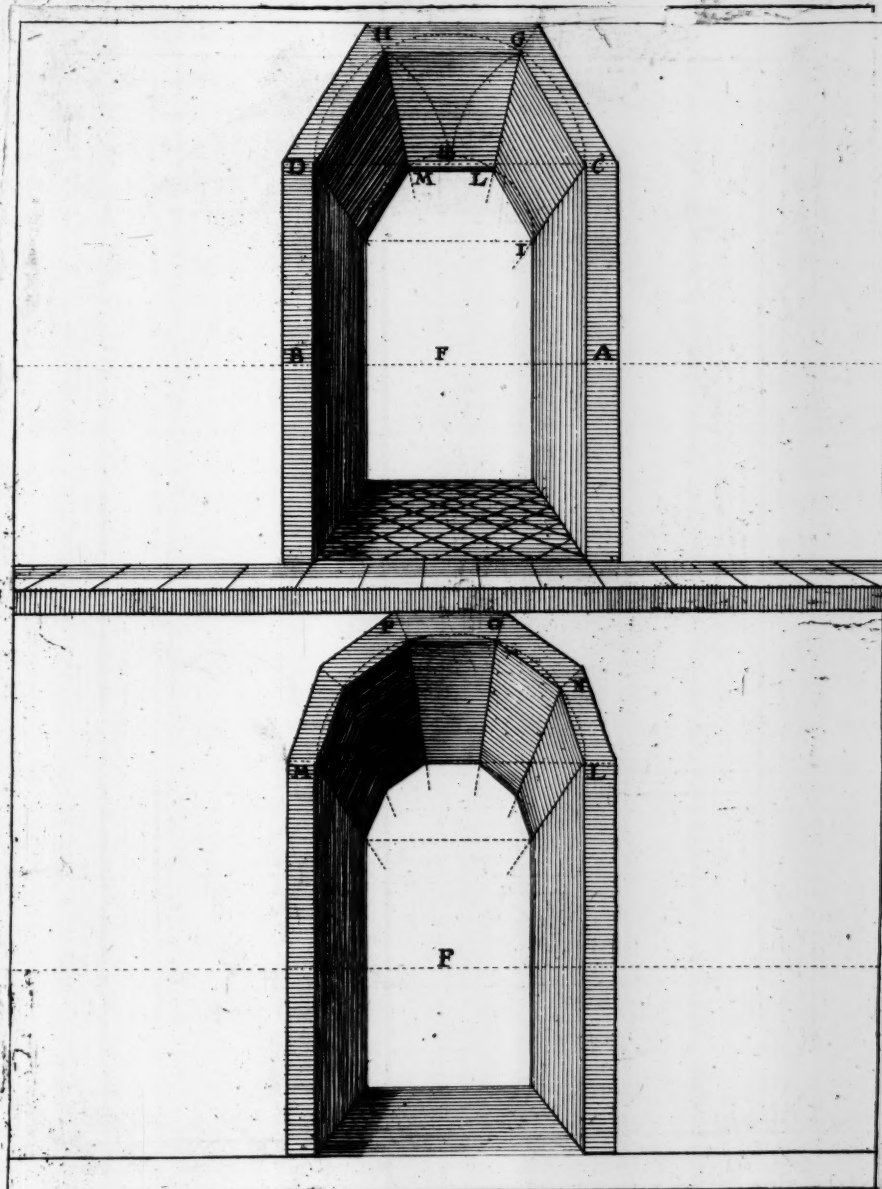
The Elevation of round Figures in Perspective.

THE defire that I have to fhew the eafinefs of fetting all things into Perfpective, hath made me fet here alfo, how one ought to elevate from a Round or Circle, fuch an height as one would have; and this Order fhall ferve for all round Figures, as Tops of a Church, Amphitheaters, Towers, &c.

Having made the Plane of the Round in Perfpective, as it is ordered heretofore, and fet on the fide of the Plane, the line of Elevation A B, according to the height that one would give it: We muft from the Angles of the Plane which are here, the Points of which they have framed the Round, as are 1,2,3,4,5,6,7,8,9, to draw Parallels to the bottom of the line of Elevation A B, and to elevate them as we have faid, and with a Compafs to tranfport them upon the Perpendiculars elevated from the points 1,2,3,4,5,6,7,8,9, &c. as in the former Orders.

The demi-round before, hath but half of the Elevation of that behinde; and the one and the other, but the fingle draught without thicknefs.

By this Order there is no round thing, which one may not fet into Perfpective; I mean Rounds, Parallels to the Horizon; The other Rounds which are Perpendiculars to the Horizon, are taught in the Orders of Vaults.

The Elevation of Pilasters fet into a Round.

WE muft double the Round, as is taught in the Plane, *fol.* 29. and between the two Circular lines fet the Plane of the Pieces, which one would elevate, as we fee the Places before A B C D, the which do draw to the Center E; Then from all the Angles of thefe Planes to raife Perpendiculars, and to give them their height, according to the line of Elevation F G, by the ordinary Rule, as is fufficiently feen by the fecond figure.

1 figure

2 figure

❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀
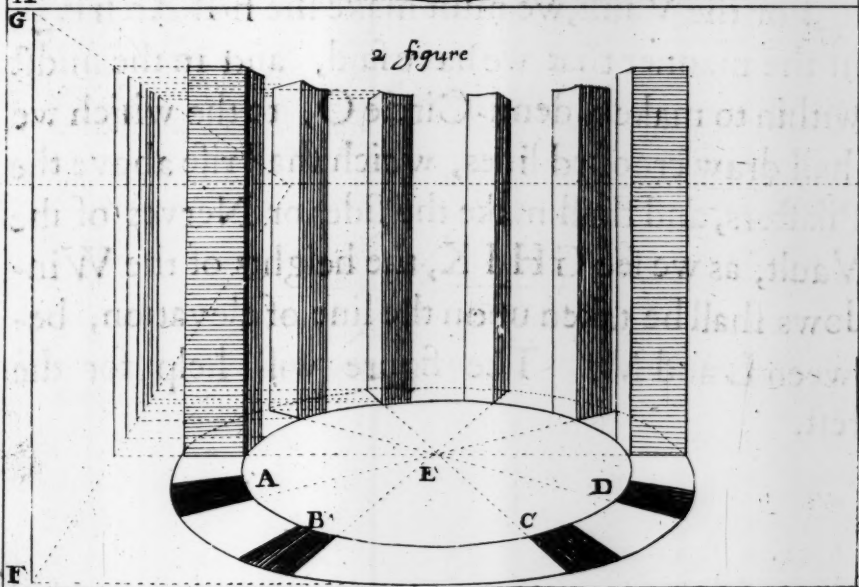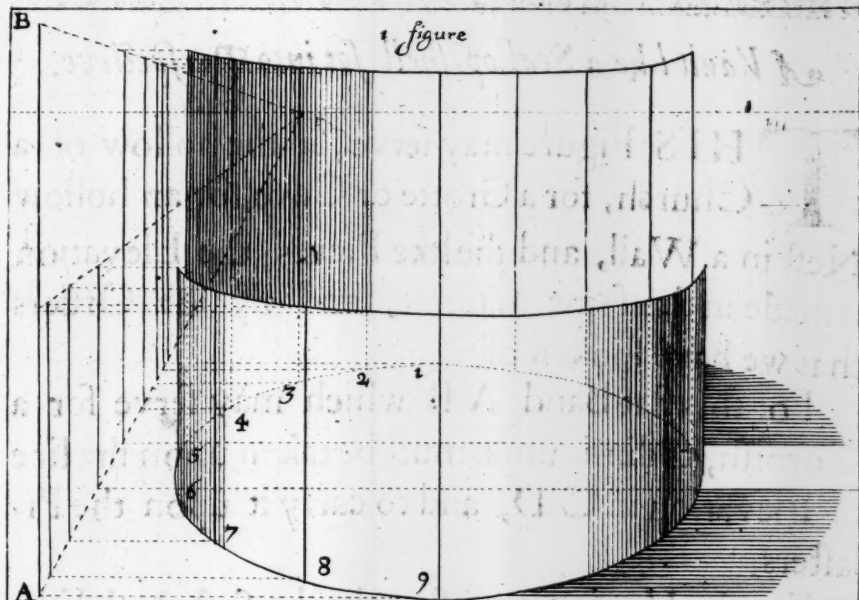
A Vault like a Scallop-shell set into Perspective.

THIS Figure may serve for the hollow of a
Church, for a Grotte or Cave, for an hollow
Nest in a Wall, and the like Pieces; the Elevation
is made in the same manner, and by the Orders
that we have spoken of.

For this flat Band A B which may serve for a
Cornish, its diminution must be taken upon the line
of Elevation in C D, and to carry it upon the Pi-
lasters.

For the Vault, we must make the first Arch E F,
in the manner that we have said, and in the midst
within to make a demi-Circle O, to the which we
shall draw crooked lines, which shall rise above the
Pilasters, and shall make the sides or Nerves of the
Vault, as we see G H I K, the heights of the Win-
dows shall be taken upon the line of elevation, be-
tween L and M.   The figure will help for the
rest.

.V.
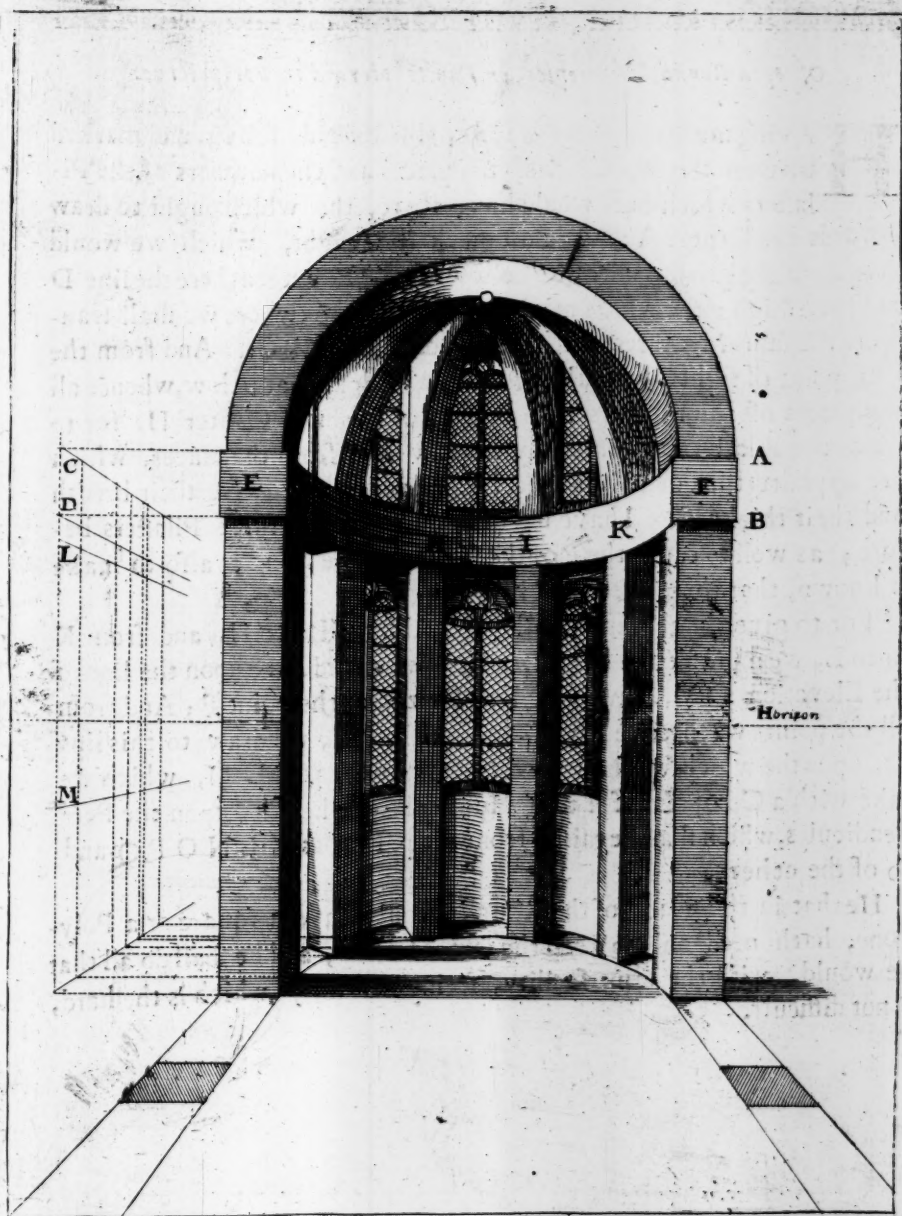
Of open Rounds in Steeples, or Vaults pierced in Perspective.

HAving made the Plane of the double Round, fol. 24. and marked between the two Circles, the places and the numbers of the Pilasters which one would have there, the which ought to draw towards the Center A: we muſt mark the height, which we would give from the ground unto the hollow of the Lovure, as here the line D and E on high: the which muſt ſerve for the baſe, where we ſhall tranſport the ſame Meaſures, which are upon the line B G. And from the ſame point of ſight G, to make a Plane on high as that below, whence all the places of the Pilaſters ſhall draw towards the Center H, for to frame the Pilaſters, we are only to draw lines from the places, which are oppoſite the one to the other, and which ſhall give their bredth and their thickneſs. I have not drawn lines to the three Pilaſters before; as well to cauſe theſe of the bottom to be ſeen, as alſo to make it known, that there needs on high, as below.

For to give the thickneſs of the Round from I unto H, and from K unto L, we muſt ſet the height, which we would have upon the line of the Elevation D M, drawing to the Horizon at the point F; And from all the points whence we have framed the Round, to draw to this line D, upon the which we ſhall elevate Plumb-lines, as D M, which we take with a Compaſs, for to tranſport all theſe heights upon the Perpendicules, which ſhall be raiſed from the points, as K L N O P Q; and ſo of the others.

He that in the place of the Round, would have a ſquare or a Polygone, hath need only to keep the ſame Method; and he ſhall do all that he would, with the ſame facility, ſeeing that this, which is the hard, is not difficult.
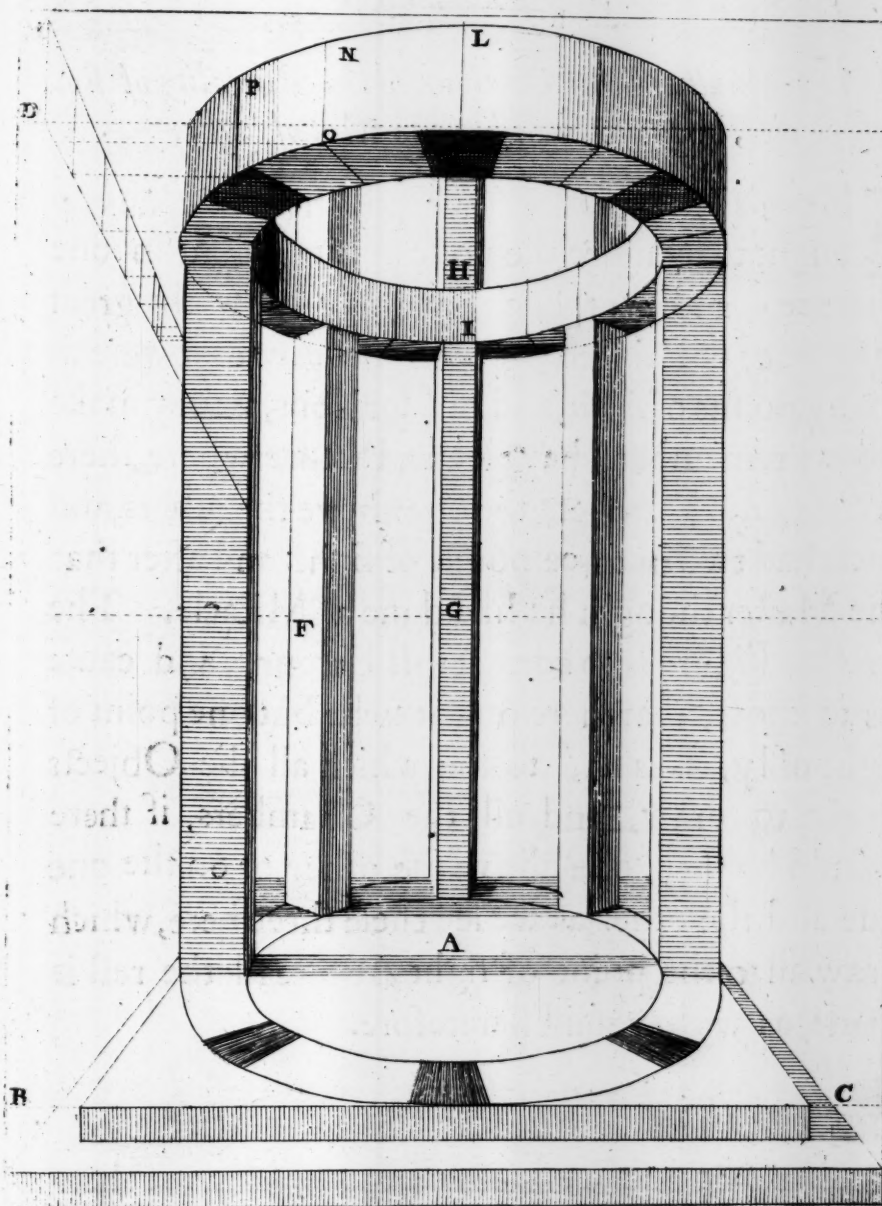
That the multitude of Objects and the Plurality of sto-ries, ought to have but one point of sight.

I Have already said elsewhere, that one never ought to set more then one point of sight in one Picture; and that hence we may know the great ignorance of Painters, which do give as it were as many points of sight, and of Horizons, as they make lines. I remember I have seen a Picture, where there were many Chambers, the one above the others, and each had two or three points of sight: and after that the Master thought he had done a Miracle. The present Figure is to correct this Errour, and cause us to know, that there ought to be but one point of sight only, as is **A**, to the which all the Objects ought to draw, and all the Chambers, if there should be fifty, one above the other, or on the one side and the other, as we see these three here, which draw all to the point of sight A. All the rest is made, as we have said heretofore.

Vji ij
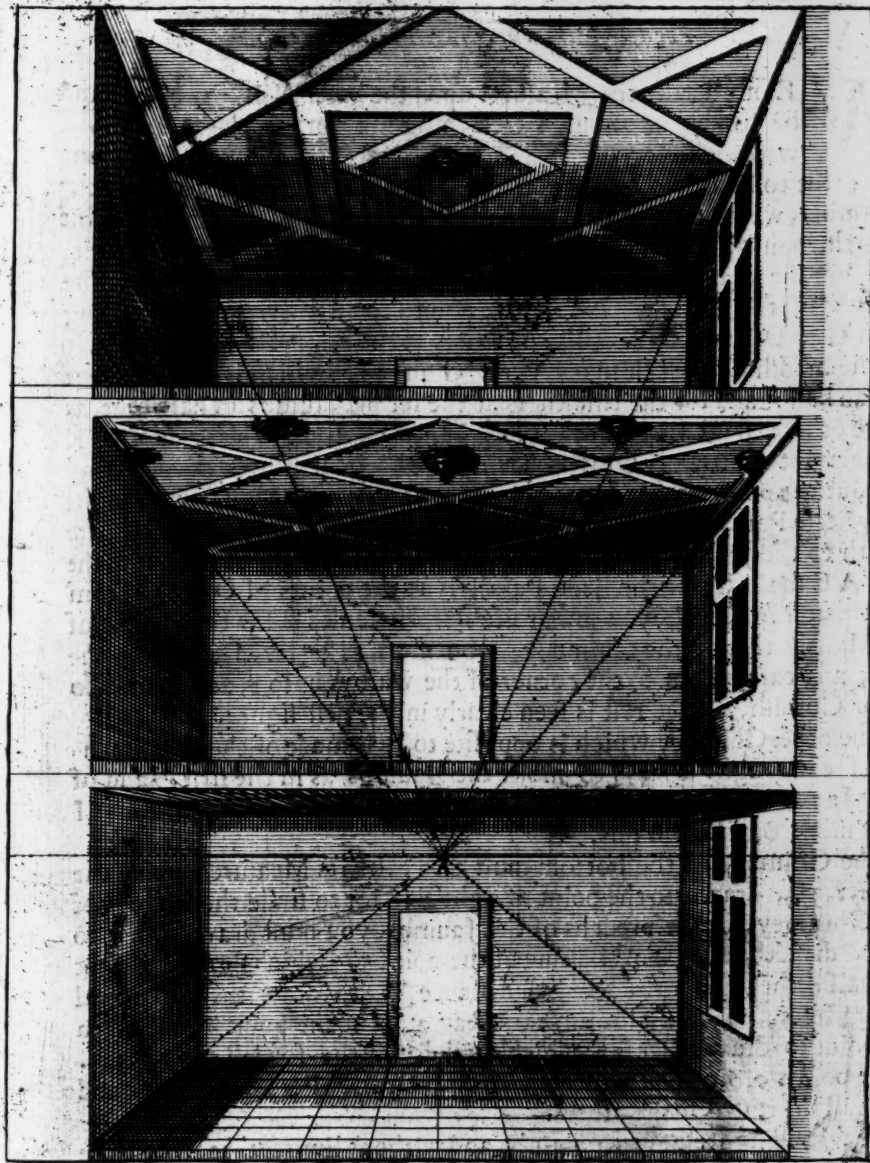
For to set Chimneys into Perspective.

WE must take the Measures upon the base A B, which must be divided into equal Parts. You may make the divisions of what quantity you will. This A B is into eighteen, of each one foot; for to make a Chimney at the Wall A, three feet within the Chamber, we must take three Parts, as A C, and draw from the point C to the point of distance D, which will give the sinking of three feet, dividing the Ray A E at the point F, you must set the thickness of the Jaumbs of the Chimney beyond the point C, as is G, then drawing from G to D, it will give this thickness at the point H. You must also set the bredth of the Chimney from G unto I, which is of four feet and an half: and for the thickness of the second Jaumbs an half foot, as at the other: Beginning at the point I unto K, then to draw from I K to the point of distance D, which will give their Measure upon the Ray A E, at the points L M, from which four points F H L M, you must draw little Parallels to the base, as F N H O L P M Q; for to give the bredth to the Jaumbs, you must take a foot and half A R, and the Ray A E shall divide the little Parallels at the points N O P Q, from which, and from F L, you must raise Perpendicules; for the height of the Mantle-tree of the Chimney, you must take five feet upon the base, and carry them to the corner of the wall A unto S, and from S to T for Cornish, all the rest is seen clearly in the first figure.

The other Chimney which is opposite to it, is made of the same manner, for we ought always to make the Jaumbs as in the first; and of these Jaumbs, to make Columns, Termes, and all that one would. I have made Brackets to this.

The Chimney of the bottom must also take its Measures upon the base 1, 2, 3, 4, drawn to the point of sight E, for to finde the hollow of the Chimney, as the bredths of the Jaumbs, you must draw from 7 to E, and divide the lines of sinking at the point 5, which shall be a foot and half: then from the point of distance V, to draw the Diagonal passing by 5, which shall divide the Ray 2. E. at the point 6, and from this point to draw a Parallel which shall divide the four Rays 1, 2, 3, 4. at the points 9, 6, 9, 9, from which you must raise Perpendiculars, and make all the rest as in the others.

The second figure sheweth plainly, and without lines, that which we are speaking of.
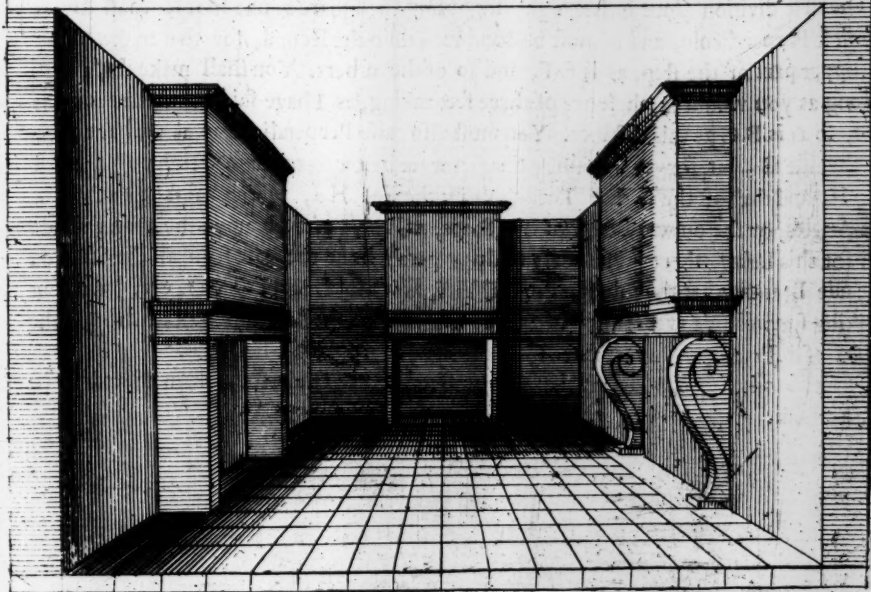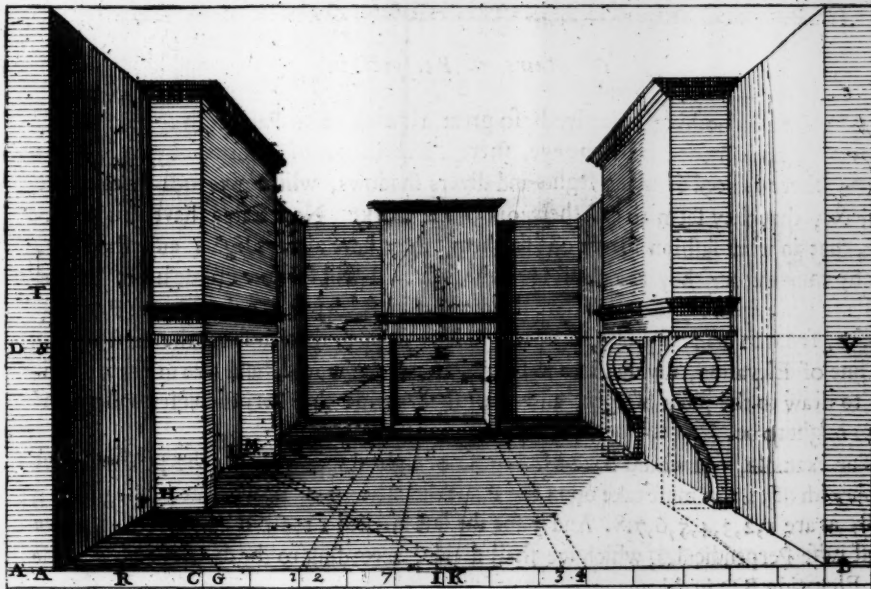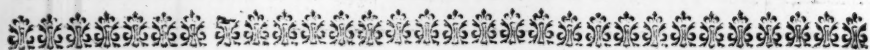
Of Stairs in Perspective.

THere is nothing that giveth so great a grace to a Perspective, nor which more easily deceiveth the eye, there is a muititude of Returns, by reason that there is need of many lights and divers shadows, which give such force to the Objects, that they seem to cast them out of the work. Now stairs have this advantage, that in what fashion soever one set them, they have always lights and shadows, and by consequence they are pleasing to the sight. I will set down some here. If one shall use little squares, they will have the more easiness, having only to raise Perpendicules, from so many squares, as he would have steps : then to set at the first square the line of Elevation, divided into as many Parts as one would, and from these divisions to draw to the point of sight, and they shall divide the Perpendicules where the steps ought to be.

For example, you would have a stair-case of eight steps, and that the last may have the bredth of 3, you must take upon the Plane the number of little squares, beginning at B, as are 1,2,3,4,5,6,7.8. And 3 for the last marked 11, from all these Angles we must raise Perpendicules, which we shall divide, according to the divisions of the line of Elevation B D in this manner.

The first division (four inches high, supposing the square of one foot) shall divide the first Perpendicule, and it must be continued unto the second, for that maketh also the upper part of the step, as is E F, and so of the others. You shall make these steps as long as you would ; as these are of three feet taking, as I have said, the square for one foot, so as is B G at this distance. You must also raise Perpendicules, as we have done on the side B ; but for to save this pains, it were better to take the height of the last step H, and that of the first I. Then to draw the line H I, which must grate upon the Angles, or the outward edge of the Steps, as E K, grateth upon them on the side B : for this being, there is but onely to draw parallells to the Base from all the Steps on the side B, untill that they divide the line H I, as we see L M N O P Q, &c. without making squares, we need only to set the Measures upon the Base, and to draw them to the point of distance. We may have the same Measures upon the line A B.

I set no other figures, seeing that this sufficeth for to Understand them all, and for to make them.

X.
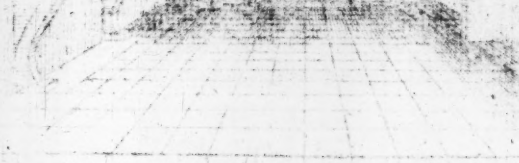
Other steps hollowed nnderneath in Perspective.

THIS manner of steps is made as those which we are now leave-
ing. As for the hollowness, there is need only to see the Fi-
gure, for to know the manner of setting them into Perspective:
These two that I present shall give an open way to the Practiser of this
Art, to invent others by.

Steps in front in Perspective.

THIS manner of steps is according to the Order of the line of
Elevation; you must raise as many Perpendicules from the
Angles of the squares of the Plane, as you would have of
steps, as are C D E F, and from the same Angles to draw little Paral-
lels unto the bottom of the line of elevation A, which shall be the
points O O O O, which you must raise until that they divide the oc-
cult Rays of the divisions of the line of Elevation A: Then to take
these Measures with a Compass, and carry them upon the Perpendi-
cules elevated from the Angles of the Plane, each according to their
Order. The first, for the first step; the second, for the se-
cond, &c.

For to finde these Returns P; you must from the same Corners P
draw to the distance Q, and to take heed, where that divideth the line
of the Plane, or the under-part of the step; for example, above the
fourth step I have made the Plane of the fifth step; Now to have
its Return P, we must from the same points P, draw to the distance Q,
and take notice where it shall divide the Ray R, which shall be at the
point S, and this point S shall be the point for to draw the line of Re-
turn S T. And so of others.
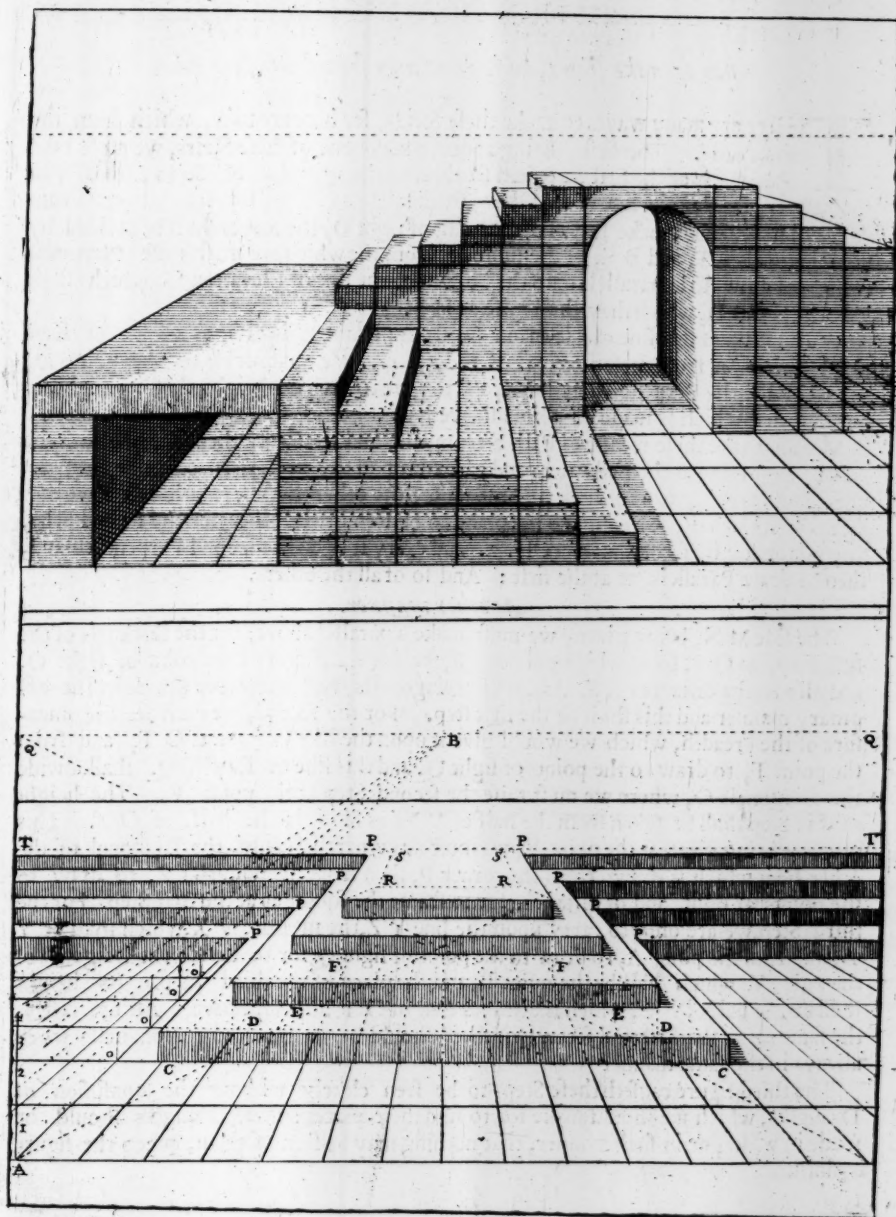
For to make stairs, which one may shew from four sides.

THere are many wayes to make these Stairs, see here are two, which seem the most easie. The first; Being about to make one of these Stairs, we must take the length of the first Step, and set theron the quantity of Steps, that you would have, as upon the line A B, I have set the points C C C, for four steps: From these points we must make Rays to the point of sight D, the Rayes shall be divided by the Diagonals A F, and B E, at the points I, from the which we must raise Perpendicules, and draw little parallels unto the bottom of the line of Elevation G, which shall give the points H, which they shall raise as H K.

We must upon this line of Elevation G, set as many equal parts, as we would have Steps, as here 4, from these four points 1. 2. 3. 4. We must draw to the point D, for to divide the Perpendiculars H K, and to give to each the height that it ought to have, as that which is made of points sheweth it.

We must take these measures with a Compass, and transport them the one after the other, beginning at the first G, 1. and carry it upon the first Perpendicular, to the corner A, as A L, then to draw a parallel unto the other side B. (but here I have not set it but at the half, for to make the plane to be seen in the other) for the second Step, you must take the second measure H. 2. and carry it upon the second Perpendicular I, then to draw Parallels, as at the first: And so of all the others.

Another manner.

The side M N, being given; we must make a parallel above, for the thickness of the first Step, as O P, from which points O P, we draw 2 Rayes to the point of sight Q, and also to the distances R S, And these Diagonalls shall frame the square in the ordinary manner and this shall be the first step. For the second, we must set the measure of the breadth, which we would give it upon the line O P, as is O T, and from the point T, to draw to the point of sight Q, and this line or Ray T Q, shall divide the Diagonals O, where we must raise the second Step at the point V. The height of this Step shall be taken from the half of V X, as M O, is the half of O T. This measure being given at the point Y, we must draw parallels unto the Diagonal of the other side, which is drawn from the corner P, then from the points Y Z, to draw to the points of sight, and of distance; for to frame the square as at the first Step. For the third Step, we are only to carry upon the line Y Z, the measure V X, which shall be Y A, and from the point A, to draw to the point of sight Q, for to divide the Diagonal of the point Y, which shall be the point B, and the place of the third Step. Its height shall be the half of B C, which is always that of O T in Perspective. All the rest is the same, as in the first and second, if there should be an hundred, you must work always in the same manner.

The third figure causeth these Steps to be seen clearly without the confusion of Draughts, which we should make for to find their places: these Draughts should be made in white; or in such manner, that nothing may be seen of them, when the figure is finished.

Stairs viewed on the side in Perspective.

YOu must set upon the base, the number of steps that you would have, that is to say, as many points at an equal distance, as here the three A B C, from these points, you must draw to the point of sight D. Then from the point A, to the point of distance E ; And this Diagonal A E, shall give the plane, and the place of the steps at the section of the Rays B C, at the points I, and upon the Ray F, which is the foot of the Wall, the point G, which is the midst of the plane of the steps, from this point G, you must draw to the other distance H, for to find the corner of the last step at the point K, and the place of others at the points I. Then from all these points I, to raise Perpendiculars.

For to give them their height, you must from the points A B C, which are upon the base, raise little lines, for to serve for the line of elevation, upon the which shall be set the heights according to their number. For example, A, which is first, shall have but one, B, which is the second, shall have two. and C, which is the third shall have three. Draw from all these points 1, 2, and 3, to the point of sight D, and you shall divide the Perpendiculars elevated from the plane, to the points O, which shall be the height of each step.

That of the other side is for to make it seem without points, and without lines. This manner of steps may serve for many things, as for an Altar, for a Throne, for the forepart of a Church, for a Gate, &c.

Stairs within a Wall in Perspective.

SEt as many divisions at the end of the Wall, as you would have steps, as here, for three, between A and B, and draw A B, to the point of sight C. Then having determined the space, that you would give to the steps, as D E, you shall draw the parallel to the base E F, which shall receive at the points I I, the sections of the lines drawn from the points G H, to the point of sight C, and from these points I I, you shall raise Perpendiculars I K, I K, which shall receive the heights of the steps, drawing from the points 1. 2. 3, to the point of sight C, as is to be seen in the second figure.

1 Figure

2 Figure

❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀

Stairs viewed on the side in Perspective.

YOu muſt ſet upon the baſe, the number of ſteps that you would have, that is to
ſay, as many points at an equal diſtance, as here the three A B C, from theſe
points, you muſt draw to the point of ſight D. Then from the point A, to the
point of diſtance E ; And this Diagonal A E, ſhall give the plane, and the place of
the ſteps at the ſection of the Rays B C, at the points I, and upon the Ray F, which
is the foot of the Wall, the point G, which is the midſt of the plane of the ſteps, from
this point G, you muſt draw to the other diſtance H, for to find the corner of the laſt
ſtep at the point K, and the place of others at the points I. Then from all theſe points
I, to raiſe Perpendiculars.

For to give them their height, you muſt from the points A B C, which are upon the
baſe, raiſe little lines, for to ſerve for the line of elevation, upon the which ſhall be
ſet the heights according to their number. For example, A, which is firſt, ſhall have
but one, B, which is the ſecond, ſhall have two. and C, which is the third ſhall have
three. Draw from all theſe points 1, 2, and 3, to the point of ſight D, and you ſhall
divide the Perpendiculars elevated from the plane, to the points O, which ſhall be the
height of each ſtep.

That of the other ſide is for to make it ſeem without points, and without lines. This
manner of ſteps may ſerve for many things, as for an Altar, for a Throne, for the
forepart of a Church, for a Gate, &c.

❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀

Stairs within a Wall in Perspective.

SEt as many diviſions at the end of the Wall, as you would have ſteps, as here,
for three, between A and B, and draw A B, to the point of ſight C. Then having
determined the ſpace, that you would give to the ſteps, as D E, you ſhall draw
the parallel to the baſe E F, which ſhall receive at the points I I, the ſections of the
lines drawn from the points G H, to the point of ſight C, and from theſe points I I,
you ſhall raiſe Perpendiculars I K, I K, which ſhall receive the heights of the ſteps,
drawing from the points 1. 2. 3, to the point of ſight C, as is to be ſeen in the ſecond
figure.

1 Figure

For winding Stairs with Rests in Perspective.

WE must remember the fore-going orders about Steps, and it will be easie to frame these winding Stairs, but to avoid the pains of searching, we will unfold the whole matter here.

By reason that the winding Stairs of this figure, have ordinarily twice as much at the bottom, as they are broad : When one would raise then into Perspective, he shall first set the Horizon, where he would. Then he must make a square, according to the ordinary rules, and double it according to the second advice of Fol. 16. and to divide this square by an unequal number of little squares, that the Walls which should be in the midst, may be of the measure of one little square.

In this figure each square hath 9 sides, or little squares of each side, the which being doubled maketh 18. for all the hollow : Of these 18. you must leave 4 at each end for the Rests, there remains 10 little squares, which we will make to contain 1 foot every way, of which we shall make ten Steps, or degrees, as followeth.

Having left 4 squares A B, beginning at the point A, which holdeth the place of the Wall, we will raise a good height the Perpendicule B, then the second C, and the third D, and so from the other Angles of the squares, until that one have made the 10. which we have here : This being done on the one side ; you shall do as much on the other, and all these Perpendicules shall give the depths of the steps.

For the heights, if they have one foot of depth, or breadth, we shall give them one half foot of height, which is the half of the little square A O : this height being taken with a compass, we must set it upon the first corner, which shall serve as for the line of elevation, beginning all below at the point A, and to mark it as many times, as we would make Steps, as here 10. unto the first Rest, from which we begin to ascend again on the other side opposite, where which we shall take again the Rest of the numbers following are marked there on the one side, and other unto the 23.

From all these 23 points, we must draw to the point of sight E, and to take heed to divide the Perpendicules, according to their order, that is to say, that having placed the rule upon the first point, and at the point of sight E, we must divide the first Perpendicular B, unto C, with a small draught for the first Step : For the second Step, we must from the second point divide the second Perpendicular C unto D And so of all as well of one side, as the other.

From all the Angles of these small draughts between the Perpendiculars, we must draw parallels to the Horizon, unto the Wall F, which is raised in the midst, as are the small draughts I I I I, which I have made only on one side, for to avoid confusion. It is only these parallels, which must frame the Steps : All that is, made unto that, ought to be of occult lines, which ought not to be seen, when the figure is finished.

The Rests ought to be taken from the defect of the last Perpendiculars unto the Wall, as from G, unto H, their thickness H K, is of one half foot, as of one Step.

The figure below, is the same with that above : but this is made, and the other sheweth how it ought to be made.

23
22
21

K
H

G   I

E
C

9
8

7
6
5
4
3
2

A O
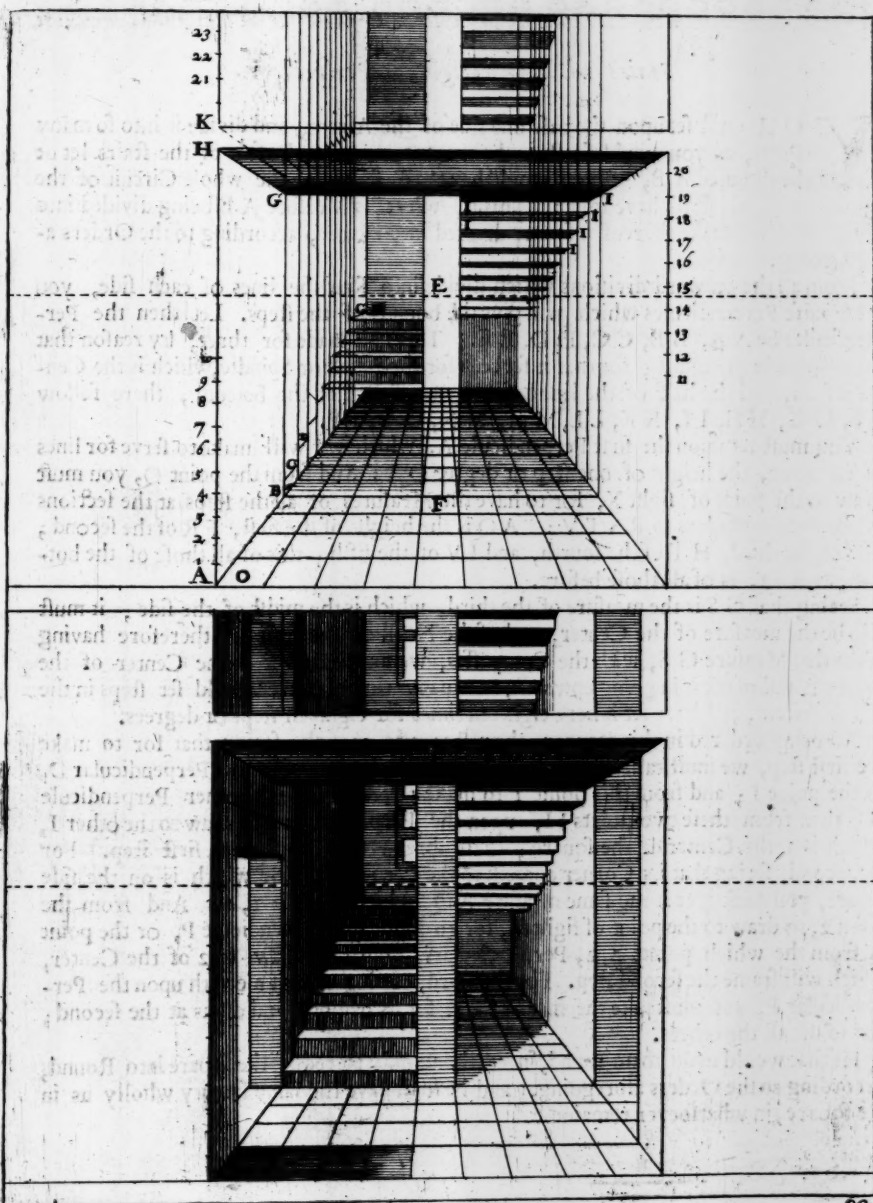
Stairs winding upright, in Perspective.

YOU muſt ſet upon the baſe one ſide of the Aſcent, and divide it into ſo many Parts, as you would ſet ſteps there : for example, the ſide of the ſtairs let be the diſtance A B, if you would have 16 ſteps for the whole Circuit of the ſquare, each ſide ſhall have four :   This is, why this Meaſure A B being divided into four, you muſt make thereof a ſquare divided into ſixteen, according to the Orders a-fore-going.

From all the outward diviſions which divide into four the lines of each ſide, you muſt raiſe Perpendicules which will give the bounds of the ſteps. Let then the Perpendicules be A A, B B, C C, D D, E E.   This E E made for three, by reaſon that the point is in the midſt ; for that it ſerveth for the Nuell or Spindle, which is the Center of all, and the half of the line before, and of that of the bottom , there follow F F, G G, H H, I I, K K, L L, M M, N N, O O, P P.

You muſt ſet upon the firſt Perpendicule A. which we will make to ſerve for lines of elevation, the height of one ſtep or degree Q A : And from the point Q, you muſt draw to the point of ſight X, for to have the Meaſures of all the ſteps at the ſections of the Perpendiculars Q R S T V :   A Q is the height of the firſt , F R of the ſecond , G S of the third, H T of the fourth, and I V of the fifth ; this of all thoſe of the bottom, as A Q, is of all thoſe before.

Seeing that G S is the meaſure of the third, which is the midſt of the ſide ; it muſt alſo be the meaſure of the Center, and of the Nuell of the ſtairs ; therefore having taken this Meaſure G S, with the Compaſſes, we muſt carry it to the Center of the ſquare ; and mark it in going upwards, as many times as we would ſet ſteps in the whole Aſcent, as I have ſet it here eighteen times for eighteen ſteps or degrees.

All being ordered in this manner, the reſt is eaſie enough, ſeeing that for to make the firſt ſtep, we muſt take the meaſure A Q, and carry it upon the Perpendicular D, to the point I ; and from this point I to make a Parallel unto the other Perpendicule B ; then from theſe two points I I, upon the Perpendiculars to draw to the other I, which is at the Center of the ſquare ; theſe three I I I will frame the firſt ſtep.   For the ſecond, ſeeing that its Corner cometh to the Perpendicule B, which is on the ſide before, you muſt give it the ſame meaſure A Q, which ſhall be 1, 2.   And from the point 2, to draw to the point of ſight X, for to divide the Perpendicule P, or the point 2, from the which points 2, 2, Perpendiculars, you muſt draw to 2 of the Center, which will frame the ſecond ſtep. For the third, ſeeing that it meeteth upon the Perpendicular P, you muſt take the meaſure F R for its height, and do as at the ſecond ; and ſo of all the others.

He that would make them round, needeth but only to reduce the ſquare into Round, according to the Orders aforegoing, and he ſhall have the ſame facility wholly as in the ſquare, in whatſoever remaineth.
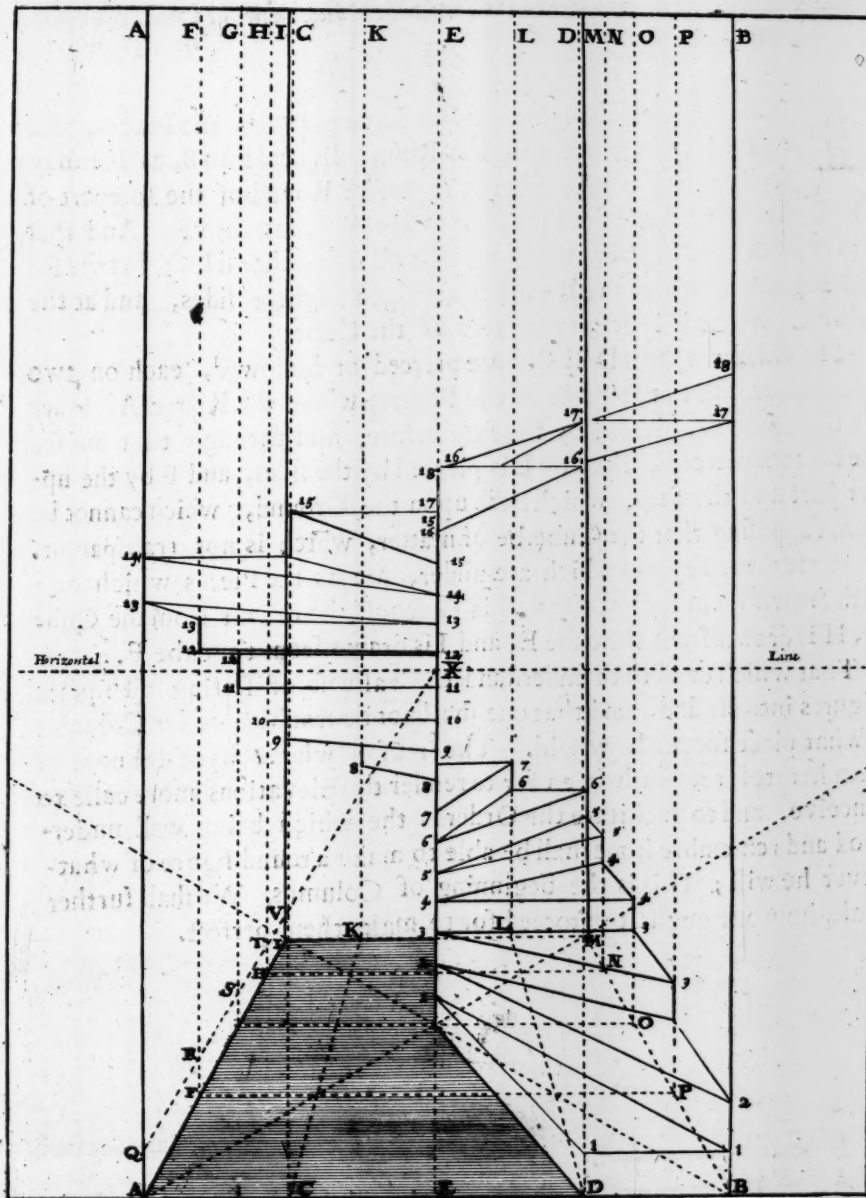
Squares set into Round, in Perspective.

THIS Order is the same that we have given in the Planes, for to set into Perspective ; the Round divided into 8, as one may see in the figure A, where the perfect Round of the forepart of the Cube, giveth the draught how to abridge that above ; And that above with that before, for to abridge all the other sides ; as we see the Figure B, where the Round is abridged on three sides, and at the other C, where it is of all the faces of the Cube.

The third Figures D E F, are pierced or hollowed, each on two sides, according to the Plane of the Figure, where the Round A, as we see the Cube D, pierced by the face before, and through that we see the bottom pierced ; likewise E is pierced by the sides, and F by the upper part and the face, which lieth upon the Ground, which cannot be seen, supposing that the Cube be of matter, which is not transparent.

These three Figures which are under, are as the Pieces which one hath drawn from each Cube ; this G should be drawn from the Cube D, H is drawn from the cube E, and I is drawn from the cube F.

That which causeth to understand the easiness of setting all square Figures into Round, and that one shall not be troubled to set Columns in what place soever he would. The reason why *I* have set none of them heretofore, hath been for to render the Elevations more easie to conceive, and to facilitate the Orders ; the which being well understood and remembred, one shall be able to make a round figure of whatsoever he will ; This is the beginning of Columns. We shall further speak, how one ought to proceed for to make them perfect.

Yiij.
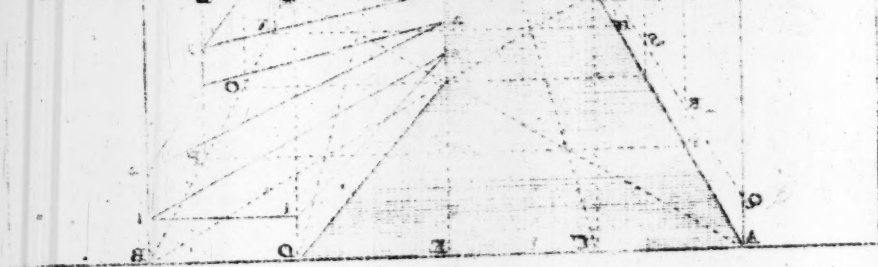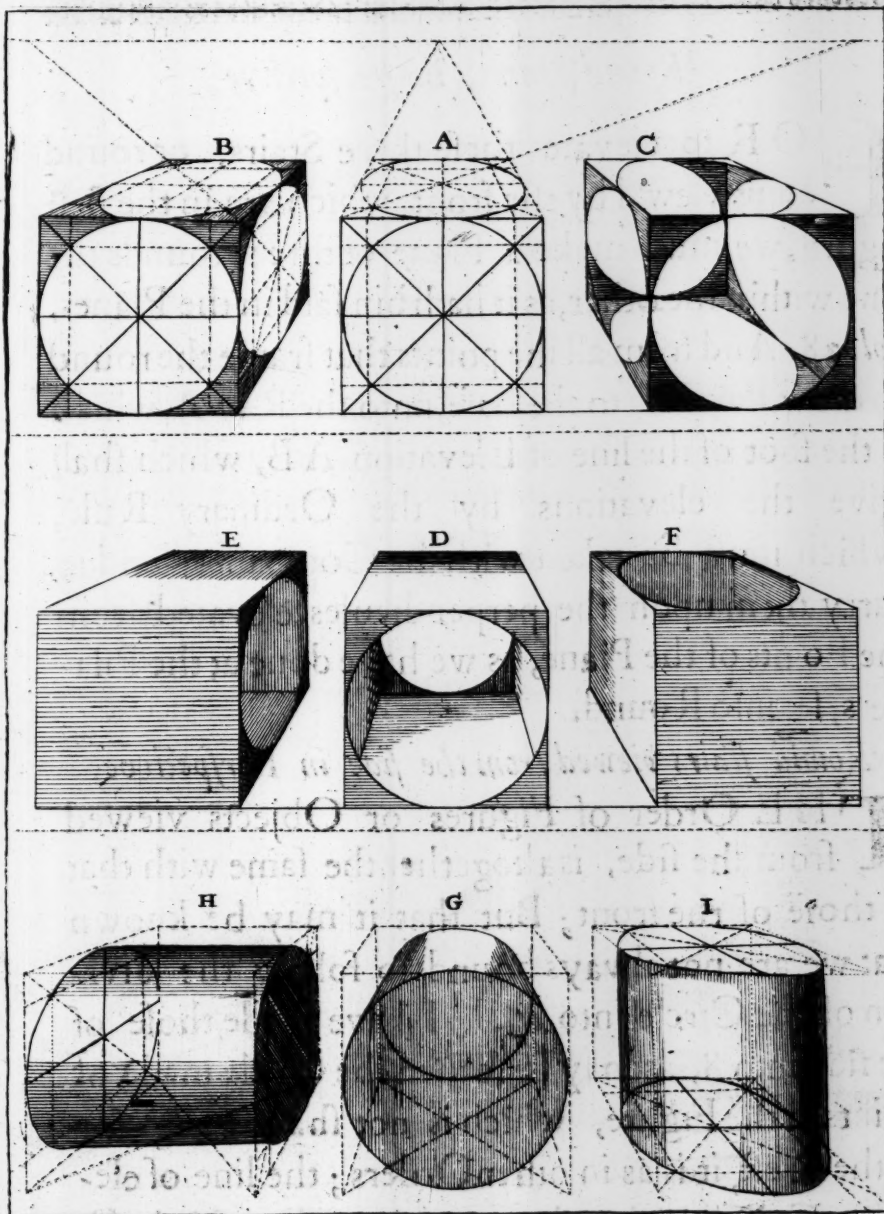
Round Stairs, in Perspective.

FOR to elevate these three Stairs, or round Steps view'd by the front, which are in the first figure, we must make a Plane of three Rounds the one within the other, as it hath bin said in the Planes, *fol.* 28. And from all the points that frame the round to draw Parallels to the Base, unto the Ray A, which is the foot of the line of Elevation A B, which shall give the elevations by the Ordinary Rule, which must be taken with the Compasses, and to carry them upon the perpendicules elevated from the Points of the Plane, as we have done at the Pilasters, set into Round.

Round stairs viewed from the side in Perspective.

THE Order of Figures or Objects viewed from the side, is altogether the same with that of those of the front; But that it may be known that we are not always bound to follow the division of the Circle into 16. I have made those of the side into 8, as may be seen in the Circle made of Points in the Figure, which is not shadowed; for all the Rest, it is as in other Orders; the line of elevation C D, which is drawn to the point of sight E.

1. Fig

Horizon

E

B

A

2. fig

Horizon

E

D

C
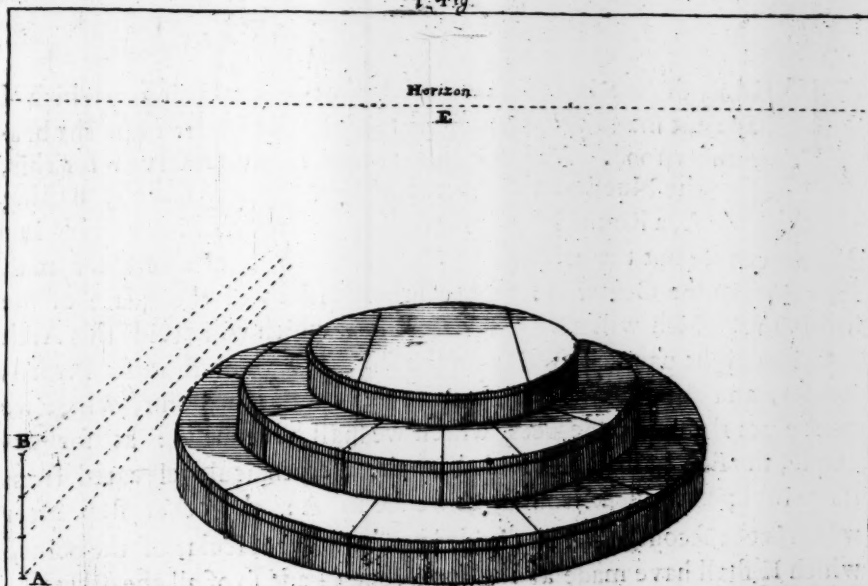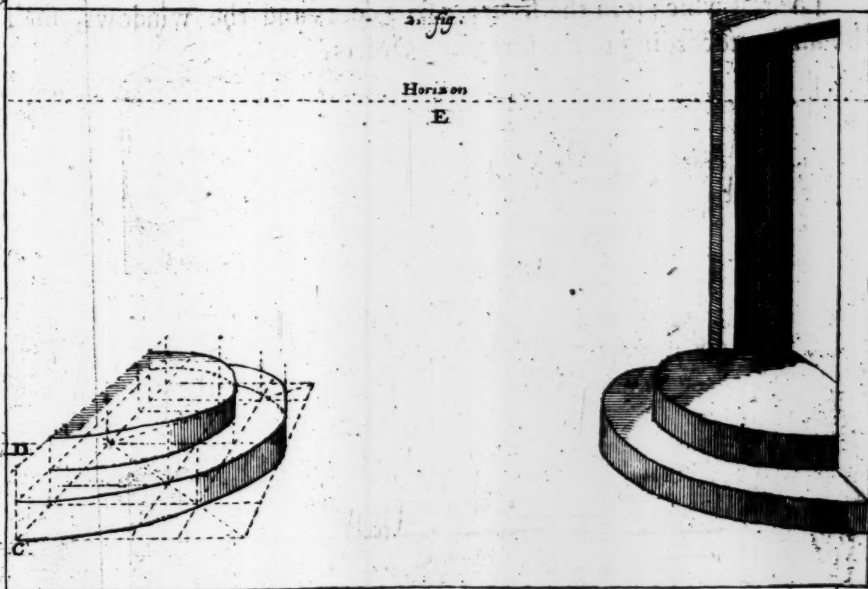
For the winding stairs, or turning Ascent.

THIS Figure is the same with that before-going, which I have not shadowed, on purpose to make the Order to be the better understood. And for this reason I have reserved for this, the Tree, or the Nuell of the Ascent, which one may finde by making at the center A, a Round in Perspective, or rather a demi-round, seeing that we can see but the half as is B C, at which demi-circle we must draw lines to the Center A, from all the divisions of the square of the first Plane, which will give G E F G H I K, which will divide this Arch B C into eight parts. And from the section O we must raise Perpendicules, and observe that they shall divide justly at the point, where we must place the steps or degrees, which we shall have made : as for example, the step I, shall be divided by the Perpendicule elevated from its point upon the demi-round, as we see in A: the other step after which is the second, shall be divided by the Perpendicular of the point, which K shall have made at the demi-round ; and so of all the others.

The rest which is in the figure, as the doors and the windows, shall be made according to the foregoing Orders.
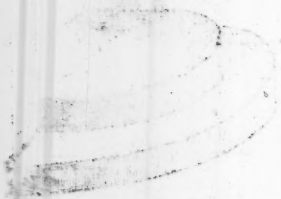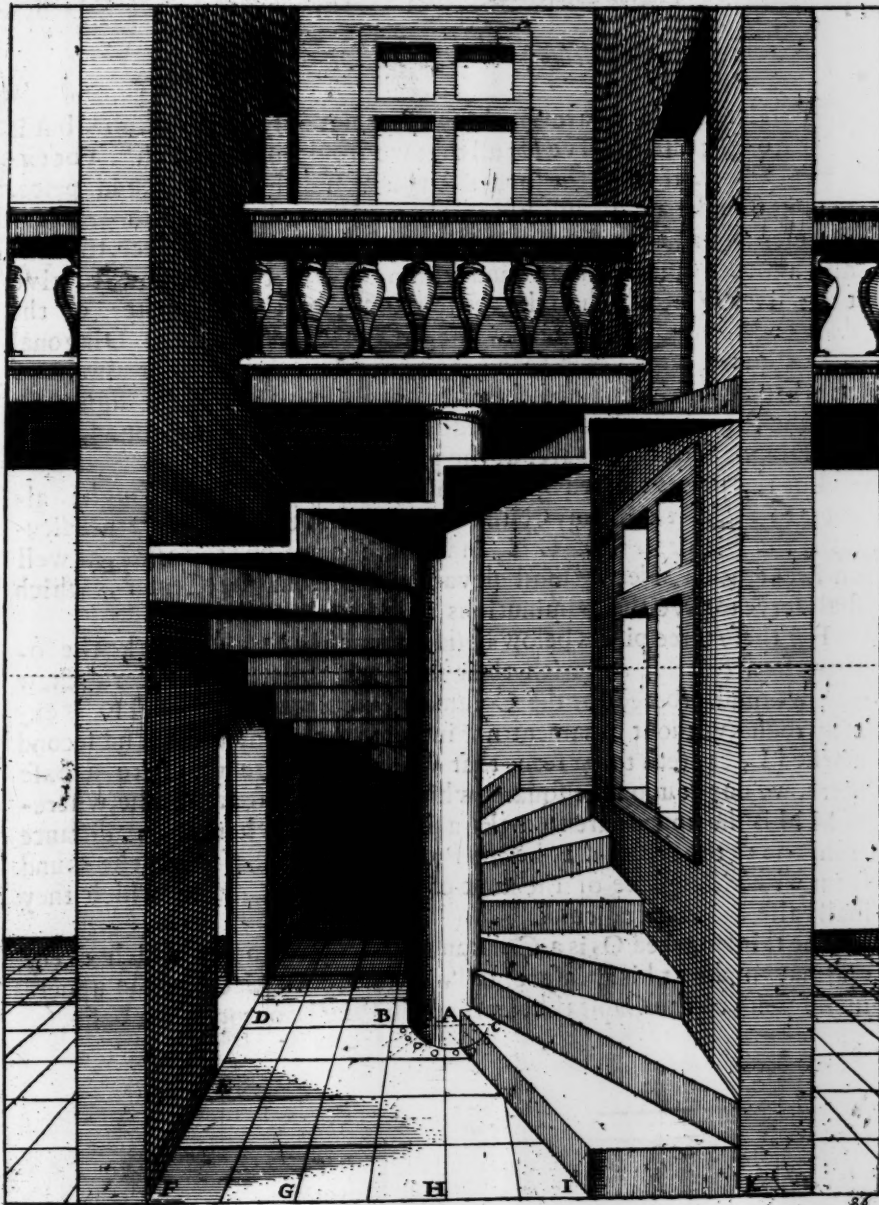
Of Columns or Pillars in Perspective.

THat which we are speaking of, is not only for the Cube, but it ought also to serve for all that we would make round. For example, if from the square A you would elevate a round peice, you must make a round within this square, according to the ordinary Orders; and at the height, which one would give to this piece, to make also another square, and a round within, as is B. For to know to give the 2 lines D E, which make the thickness, or the Diameter of the round : We must take notice where the round divideth the Diagonal of the square, and to hold for a general maxime, that it ought always to be taken at the round pieces seen from the side, as it is in the figure C, that the Perpendicules are elevated from the section of the round, upon the Diagonal of the square, at the points D E.

For the pieces viewed by the Front, as the figure F, they ought always to possess the Demy-round G H I, and to elevate the Perpendicules of the Diameter right G H, and from the one and the other, as well on Front, as on Side, we must elevate a line from the Center, which shall serve to give the Diminutions to the Columns.

For these three pieces below besides that they serve to make the others seen clearly, and with their shadows, they serve also for to shew how we must proceed for the Columns. This piece of the midst K, is exactly round, without ornament, nor intent to make any there: The second marked L, causeth to be seen, that when we desire to make a base there, we ought upon the square, which must serve for a Plinthe, whereof M N is the upper part to make a double round whereof the distance from one to the other, may be the Projector of the base, and the round from within the plane of the shaft of the Column, from which they shall raise the Perpendicules.

The third marked O, is a Column with its Ornaments which every one may make at his pleasure, and we must take notice that the uppermost square of the Capital answer to the Plinthe or top of the base,
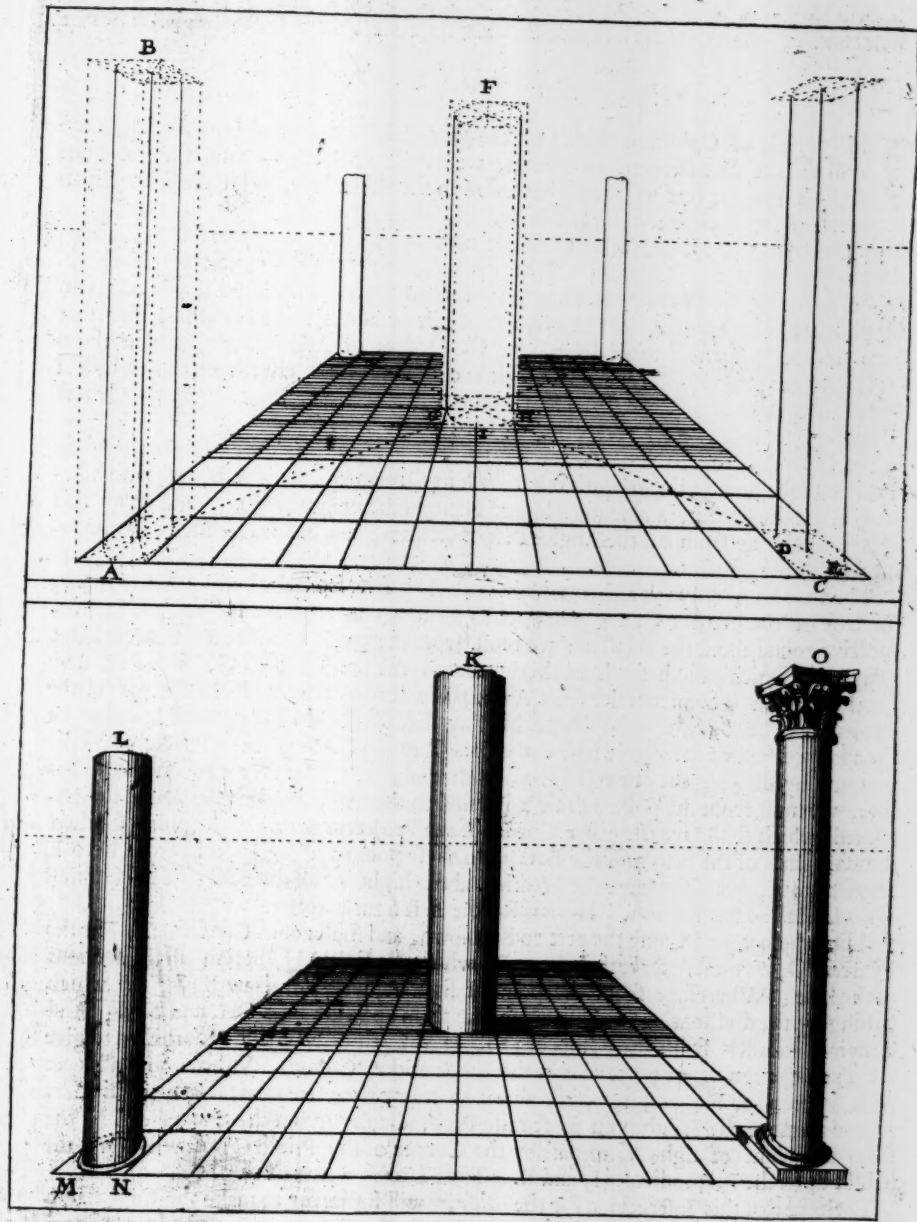
Of Cornishes and Mouldings in Perspective.

IN pursuit of Columns, which are the principal Ornament of Architecture, we
will set the Cornishes or Mouldings, with their Projectors, which we have not
set hitherto, for fear of giving confusion to the Elevations, which it behoveth to
be understood with clearness and easiness.

It is true that there are not many Buildings made, which have not some few Mouldings
and Projector for their Ornament, for to make them more pleasing to the eye: where-
I thought fit to set here the manner, not of framing them, seeing that dependeth on
the pleasure of every one, nor to give them their Measures and Projectors, for that
were to oblige my self to fit down here, the Orders of Architecture, and a thou-
sand other Inventions of Ornaments, which one may finde elsewhere, and which I
suppose are known. But only to set them into Perspective, according to the Orders
following, when any shall have occasion for such an Order.

For to set then the Ornaments for a Pilaster in Perspective, we must take the Mea-
sures upon the middle line of some other with its Ornaments, as is A B, of which ha-
ving taken the bredth, and made a square Plane in the ordinary way ; and from this
square to elevate from all the Angles Perpendiculars, we shall frame the body or so-
lid part of the Pilaster.

Then we must only take that which projects it self from the body ; for example,
the base of the Pilaster C, and transport its measures as in D E. for to set it in Per-
spective round about the Pilaster : we must from the point of distance F draw a line
Diagonal, which passeth forth of the square to the point E unto G, it is no matter
for the length : Then from the point A to make a Ray passing to the lower part of the
Projector H ; and at the point where this Ray shall divide the Diagonal at I, it shall be
the advancement of the whole base : the same Ray A H shall give the Projector of the
bottom, by dividing the other Diagonal at the point K : Then for the Projector be-
fore, we must from the point I draw a Parallel to the base, until that it divide the Di-
agonal, which shall give the other Corner of the Projector before at the point L; then
drawing lines of the height of the Base unto these points, as are M to L, from D to I,
from N to K, you shall have the bredth and the hight of all the Base ; The Capitall
is made of the same fashion. Here is for the first figures above.

Those below shall Cause the rest to be known, and shall avoid Confusion. For the
Pilasters O, we must observe that above P, where the line D H, bereth all the sections
of the base ; Wherefore from the point of sight A, we must draw Rays, the which
passing by the divisions of D H, must marke them upon the lines D I, and N K ; And
drawing Parallels from the points of D I, to M L, there will be no more then to give
the Turnings about, or wheelings as the shape of the Colum. When you shall meet
with squares, or Flat-bands, either above or below they are made by Perpendicular.
As for to make the Plinth, you must raise Perpendiculars from the Points L I K; the
from the point of sight A, to pass by the Corner of the Plinth Q, it will give the
height upon the Perpendicules I, and K. Then L must be equall to L.

I beleeve that this Instruction for the Base, will suffice for to make the Capitall be-
ing the same Order. This last Pilaster R, is only for to cause one to be seen without
being mingled with lines. We have broken them, for to make the Bases and Capitall
to be seen, not having had space Enough for to make them appear whole.
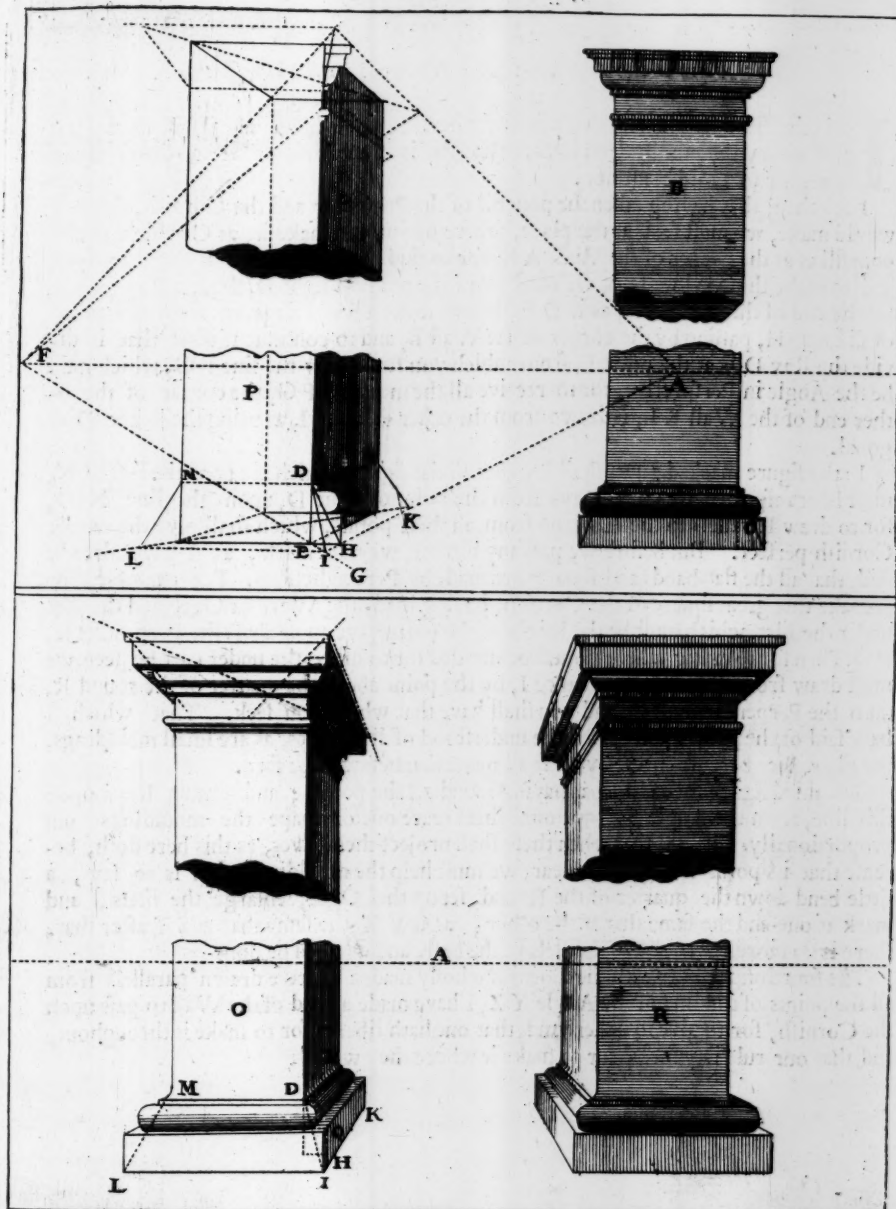
A great Cornish above the Horizon in Perspective.

IT is the same Order with that which we have explained, but as it is somewhat difficult by the multitude of lines, I thought it convenient to set it down again here, for to avoid confusion.

I say then, that having taken the pourfill of the Projector and the Cornish, that one would make, we must set it at the place, where one would make it, as C which is the pourfill is at the corner of the Wall A B, for to find the height which it ought to have, and to make those below seen, we must from the point of sight D, draw a Ray passing by the end of the pourfill E, as is D F; then to make a line Diagonal from the point of distance H, passing by the corner of the Wall B, and to continue it until that it divide the Ray D E at the point F, from which you shall draw the line F G, which must be the Angle in Perspective, for to receive all the measures F G, the corner of the other end of the Wall K L, is drawn from the other distance I, as being the other Diagonal.

In the figure marked 2. we shall see, that all the figures which are upon the line M N, must be transported by visual Rays from the point of sight D, upon the line N O, for to draw Parallels to the Horizon from all these points, which shall give the whole Cornish perfect. But before we pass any further, we must mark, as I have already said, that all the flat-bands and squares are made by Perpendiculars. For example, for to make this great square of the Cornish, having made the Wave or Ogee, and the filet under the filet, which must be the height of the square, we must abase the Perpendicule, P Q. Then for to know where it must be divided for to make the under part be seen, we must draw from the point of distance I, by the point above the quarter of the round R, unto the Perpendicule P Q. and you shall have that which you seek. That which I have said of the great square, must be understood of little ones, as are small mouldings, the filets, &c because that they must all make that below to be seen.

The third figure sheweth, that having found all the points, and drawn Rays upon this line, from the Angle S T, we must there trace out or shape the mouldings out proportionally. I mean, that when these shall project themselves, as this here doth, because that its point of distance is near, we must help the mouldings, that is to say, a little bend down the quarter of the Round, set up the Ogee, enlarge the filets, and mark at one end the same that at the other; as at V X, the same that at S T after that, there is no more but to draw parallels to the base, and all shall be done

The fourth figure sheweth the Cornish wholly made: I have drawn parallels from all the points of the line of the Angle Y Z; I have made an end of the Wall to pass upon the Cornish, for to give to understand, that one hath liberty for to make it throughout, and that our rule is general for to make it where they would.
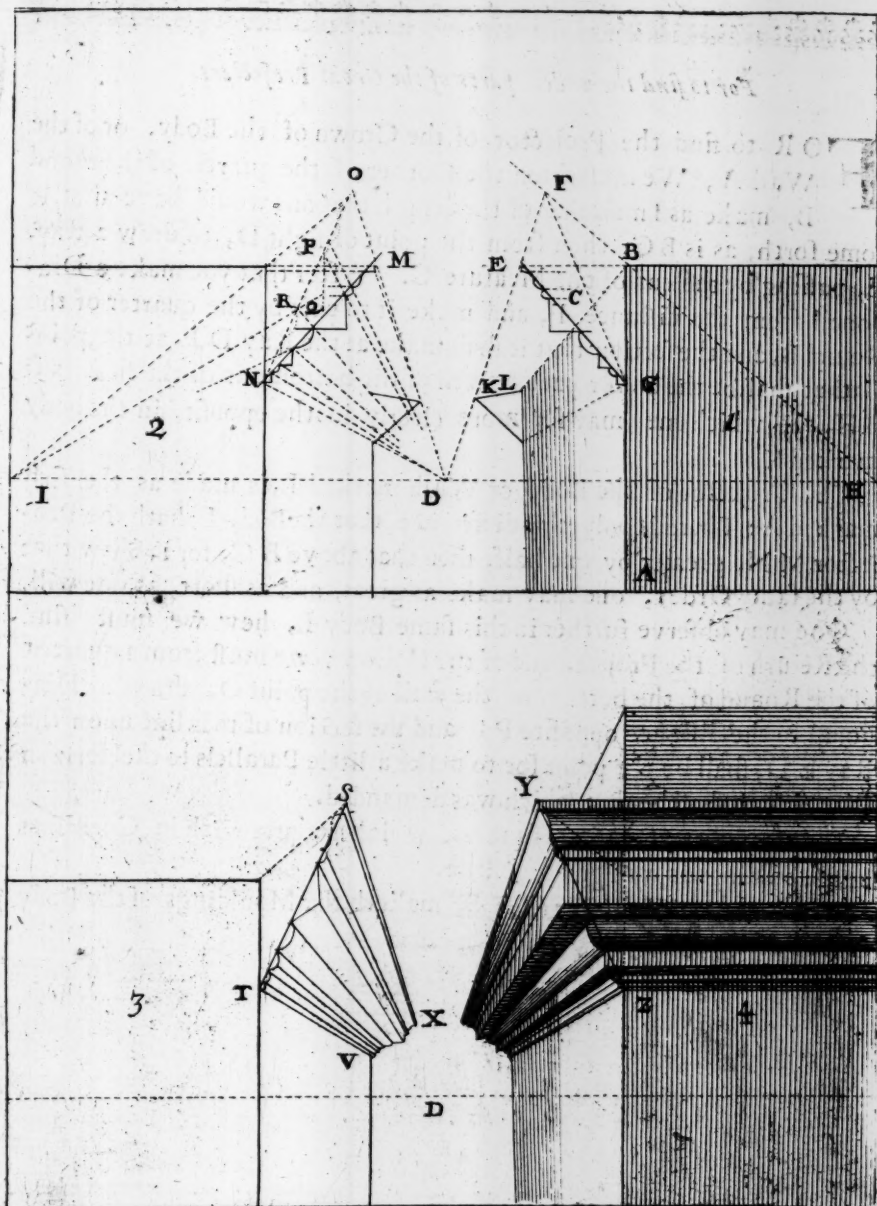
For to find the under parts of the Great Projectors.

FOR to find the Projector of the Crown of the Body, or of the Wall A; We muſt from the Corner of the quarter of the round B, make as ſmall line of the length that one would have that it come forth, as is B C, then from the point of ſight D, to draw a Ray, E, paſſing by the end of the Meaſure C.   After that you make a Diagonall from the diſtance F, and make it to paſs by the quarter of the Round B, and the ſection that it ſhall make at the Ray D E, at the point G, that ſhallbe the under part, aswell of the bottome as of the ſide, as is B H, the which one may ſee more cleerly in the oppoſit, in the body marked K

The Projector of the Body, or Wall marked L, is made as the firſt marked A: There is only this difference, that the Body L, hath the Projector M N, greater by one half, then that above B C, for to Shew that by the ſame Order, one may make as great, and as ſhort, as one will.

One may obſerve further in this ſame Body L, how we muſt find the Return of the Project, and of the Hollow ; we muſt from a quarter of the Round of the bottom of the wall at the point O, draw a Diagonal to the diſtance oppoſite P ; and the ſection of this line upon the Ray E D, ſhall be the point for to make a little Parallels to the Horizon R Q, which ſhall be that which was demanded.

This may ſerve for all the ſquares, which are met with in Corniſhes and Mouldings aswell great, as little.

The Body, or Wall, marked S, maketh the Mouldings of the Body L, to be ſeen cleerly.
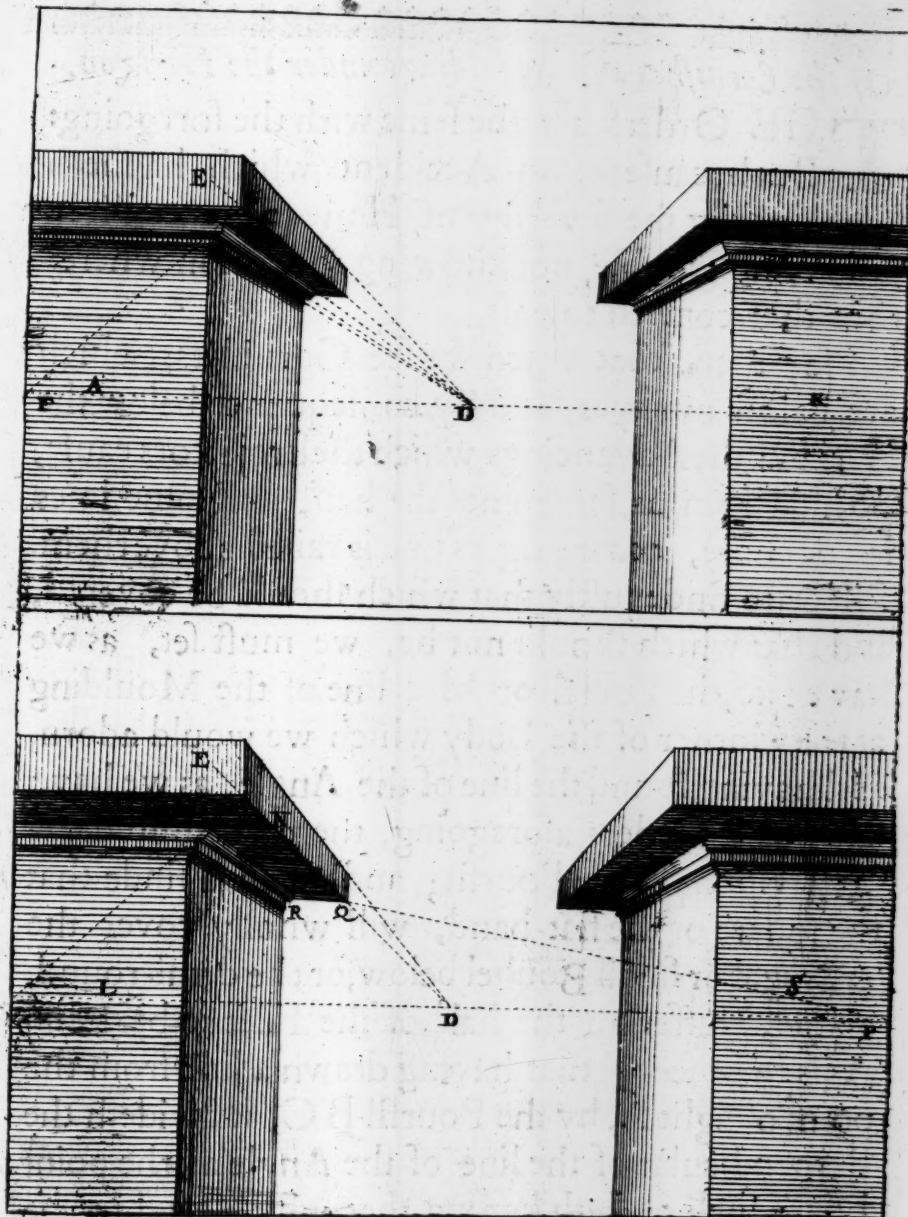
Of the Cornishes and Mouldings under the Horizon.

THE Orders are the same with the foregoing:
But because of an Accident which hapneth
sometimes by the diversity of Horizons one might
be in some trouble, not knowing the reason where-
fore that cometh to pass,

I say then, that when we see Cornishes, which
are below our eyes, and by consequence below the
Horizon, the Advancings which the Projectors cause,
do hide from us, sometimes the half, and sometimes
less or more, according as one is raised above them.

For to finde justly that which should be covered,
and that which should not be, we must set, as we
have said, the Pourfil or Mid-line of the Moulding
at the Corner of the Body which we would adorn,
and having found the line of the Angle, as we have
said in the Orders aforegoing, there we must draw
the divisions of the Pourfil; and we shall finde that
the square or the flat-band, will wholly cover the
Astragal or small Boultel below, or the demi-round,
and will suffer but the half of the Filet to be seen;
As is to be seen, that having drawn a line from the
point of sight A, by the Pourfil B C, it divideth the
Perpendicular of the line of the Angle at the point
D; which maketh known that which ought to be
covered, for the moulding below, it is the same thing
with the Orders foregoing.

A

1 fig.

B
C
D

2 fig.
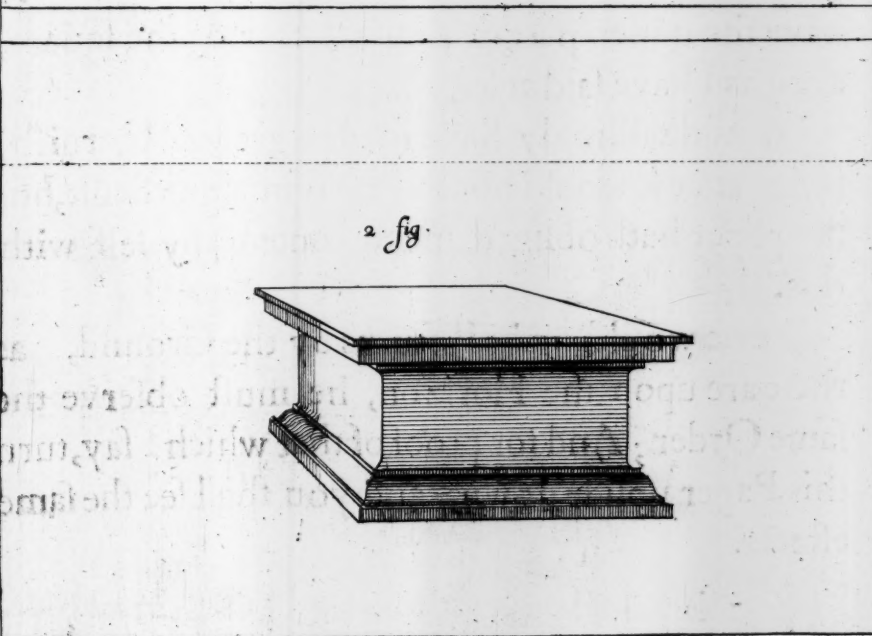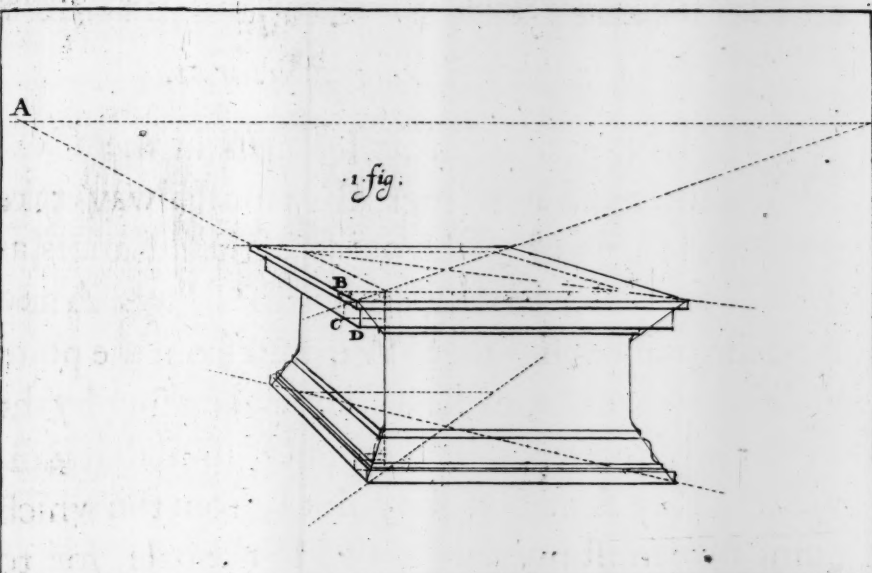
For Cornishes with many Returns.

WHEN there are many Returns in the Cornishes or Mouldings, they must always take their under-parts from the points of the distances, as may be seen, that having drawn the Rays A and B, at the point of sight E : We must from the point of distance C or D, make a Diagonal passing by the corner of a quarter of the Round O, until that it divide the Ray A or B at the point I, from the which point I we must make a Parallel to the base, for to have the under-part, or the Projector of the square, even as I have said at fol. 98.

I would willingly have made a greater Cornish, seeing that it would not have bin more difficult, but the paper hath obliged me to content my self with this.

If one would make Returns by the Ground, as these are upon the Horizon, he must observe the same Order ; And for proof of that which I say, turn this Paper upside down, and you shall see the same effects.
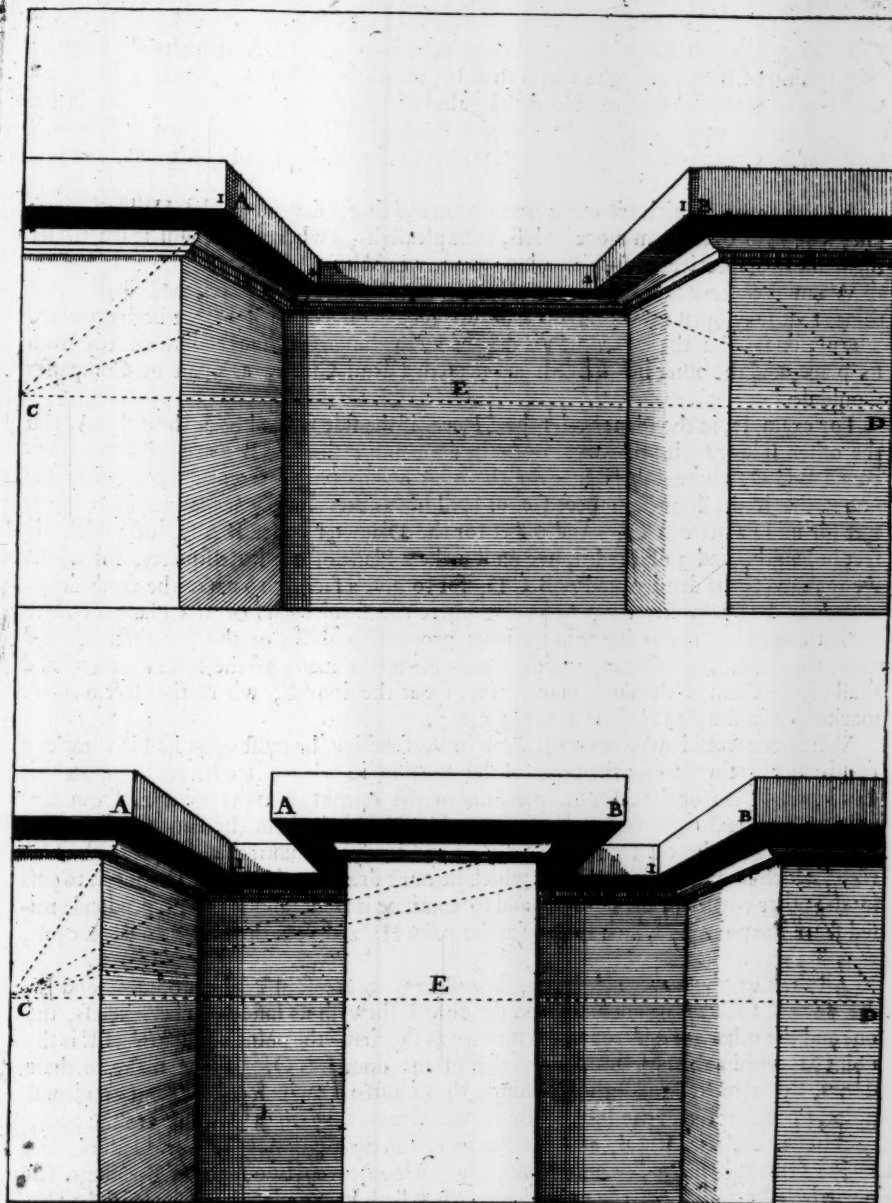
For the Openings of Doors in Perspective.

SEeing that hitherto we have followed very near the Order which they keep in raising of Buildings, whatsoever they be, we ought to follow in teaching the manner of Garnishing them, and making them fitting for to lodge in : I will begin by the doors of wood; afterwards we will speak of other Openings, as of Windows, Cupboards, Chests, &c. Then of Moveables, Tables, Beds, Chairs, Coffers, Settles, Benches, &c,

All the doors, which are made for to open and shut, depend of the Will of every one, who may open them more or less, as he pleaseth; wherefore I will teach to set them into Perspective, at such opening as one would have.

We must observe that the Doors, Windows, Cupboards, Chests, and in short all things that may open and shut, do make always a demi-round in their whole opening. The reason is, that the side which is fastned by the hinges or hooks, doth not stir from its place; and the other side moveth and maketh a demi-Circle, as a pair of Compasses would do.

For example, in the Plane under the Figure, if the side fastned be at the point A, and the other side at B, if you would open the door fully, the side B shall make the demi-round B C D, whereof the center shall be A, as one may see : from whence one may know, that if the door hath theee feet of bredth, as these have; it shall have also three feet for its Diameter A C; And 6 feet for the Diameter entire B A D, of which six feet in length, and 3 of bredth, we must make a Plane of 18 little squares, for which we shall make the demi-round A B C D, for to give a facility to make the same demirounds in the Perspective. by observing where the demi-round of the Plane divideth the little squares, for to divide in the same proportion those of the Perspective, and there to make a demi-round, which shall take up as many of the little squares, and shall divide them in the same place, as we see at the door E, where the sections are marked, as in the plane below 1,2,3,4,5,6,7.

When one would make an open door in Perspective, he must upon its Plane make a demi-round; then to set the point of the opening in what place he will, upon this demi-round; as for the door E, the point of the opening is at the point 2. from this point 2, he must elevate a Perpendicular 2.H. And again from the same point 2, draw a line passing by the corner of the door F, and continue it until that it divide the Horizon which is at the point G, from which he must draw another line, making it to pass by the other corner of the door I, and to continue it till it divide the Perpendicule raised from the point 2, which shall be at the point H, and you shall have the door open, as is F I H, 2.

All the Openings are made by the same Rules, as are seen by the doors K and L; the door K sheweth its out-side, and the door L sheweth its inside; nevertheless, the one and the other are ordered in the manner as the first; the point accidental of K is the point M, within the Horizon. And that of the door L is O. If one make to these doors, barrs, locks, and such like things, they mustbe drawn from the same accidental point, as the barr and the lock of the door L, draw to the point O. These are the points which they call Accidental, as I have expressed in the beginning of our Orders, and all the Openings make but one within the Horizon, except two sorts of Openings. The one when the door is wholly opened, for then it hath its point at the point of sight, because it is at the wall. The other, when it is Parallels to the Horizon, because the Parallels never divide themselves but are drawn right, as is the door N.
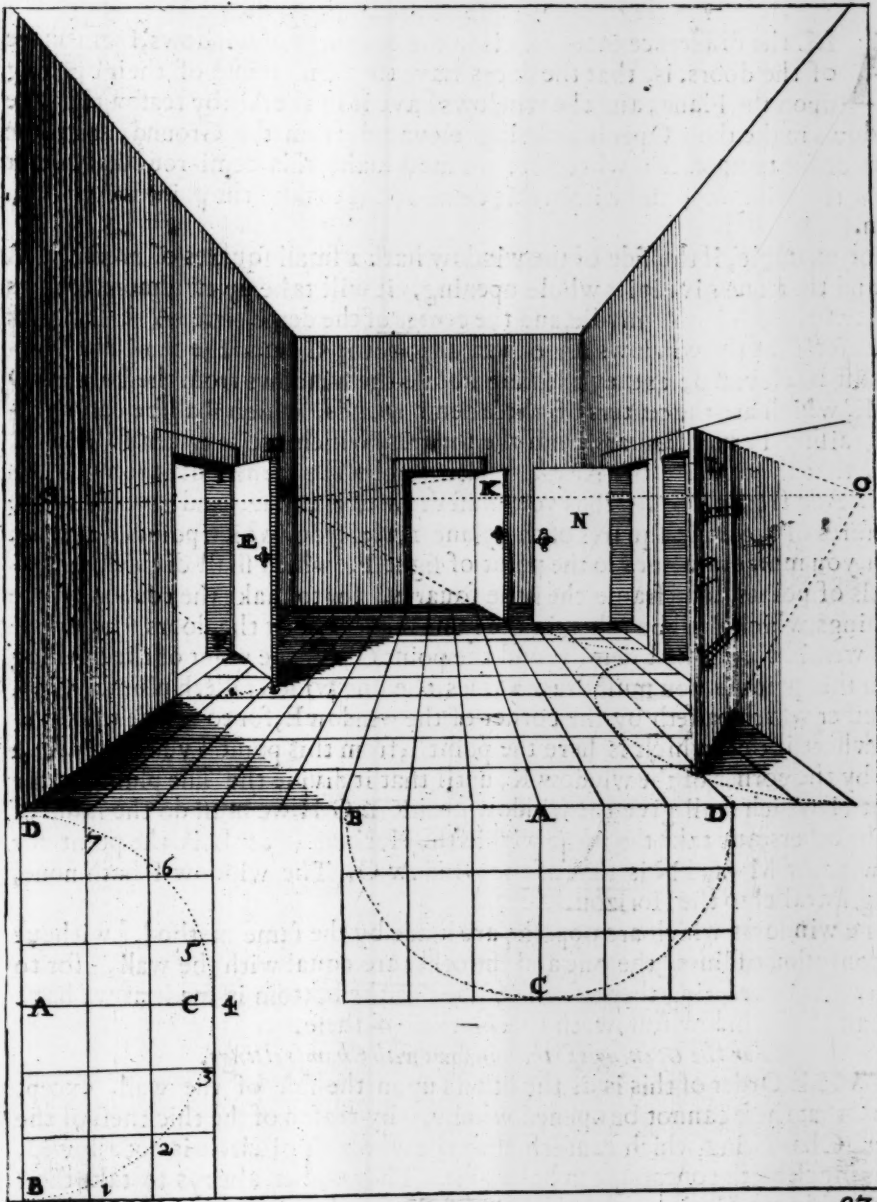
For the Openings of Windows in Perspective.

ALL the difference that there is in the openings of windows, from those of the doors, is, that the doors have the demi-round of their opening upon the Plane, and the windows have it in the Air: by reason that the windows make their Openings being elevated from the Ground, and the doors do grate upon it : wherefore we must make this demi-round above or below the windows; and within this demi-round to take the point for to open them.

For example, if the side of the window hath 2 small squares of bredth, as A B, and that one give it its whole opening, it will take up two more squares C A, whereof A is the middle, and the center of the demi-circle A B C. But by reason that the windows are elevated from the Ground, the demi-round also must be elevated, as they are here above the windows from the corners D and E, which are the centers of these demi-rounds, which shall be easily framed, raising Perpendiculars from the squares, which are between C and B, until that they divide the Rays, which pass by the corners of the windows D E. And from these sections you must draw to the base, and give them the measures of the little squares of the plane 1,2,3. from which points 1,2,3. on high, you must draw lines to the point of sight F, which shall divide the Parallels of points, and frame the little squares, for to make the rounds of the openings, which shall be taken in the same manner as at the doors; as if one give within the highest demi-round the point G, for the point of the opening from this point G, you must draw 2 lines, the one which falleth plumbe G H, the other which passeth by the corner of the window E, for to divide the Horizon where it can, which is here the point I; from this point I you must also a line by the corner of the window K, until that it divide the line plumb at the point H, which shall give the window open K E G H; we must do the same of all the others, and take the point within the Horizon; as L is the point for the window M; and N is that of the window O. The window P hath none, being Parallel to the Horizon.

The windows which are opposite are made by the same method, without the confusion of lines, the one and the other are equal with the wall, for to facilitate the ordering thereof. The door at the bottom is made as we have said, and the window followeth the Method of these.

For the Opening of the windows with Chamfrettings.

THE Order of this is as the others upon the side of the wall, except that these cannot be opened wholly, by reason of the thickness of the Chamfring, which causeth, that the whole demi-circle is not allowed, but as much as the opening can have of it. They ought always to take their point within the Horizon, as we see Q and R, for the opening of the windows on high; that below is Parallel to the Horizon.
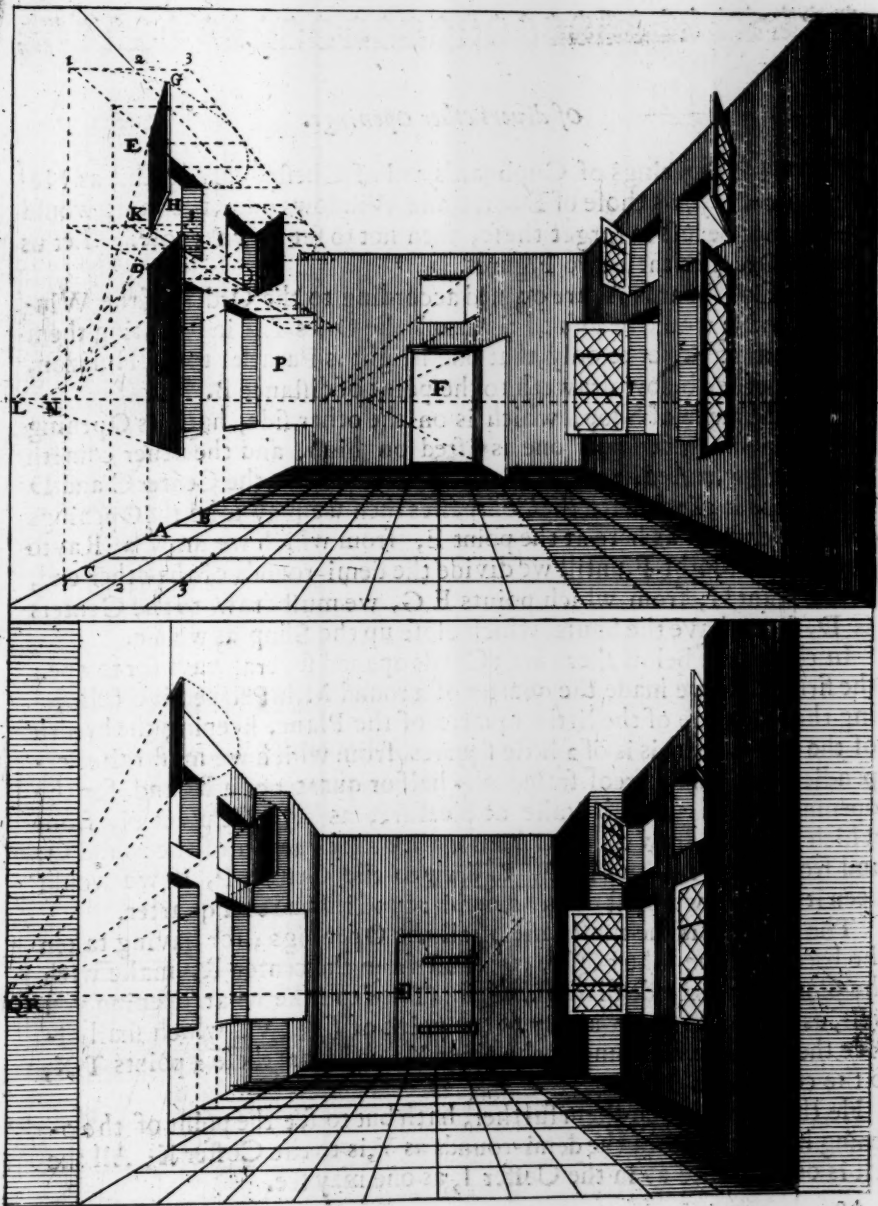
Of divers other Openings.

THE Openings of Cupboards and of Chests, are at least as Ne-
cessary, as those of Doores, and Windows; and the fault would
not be less to forget these, then not to set down those.　　Let us
see the Order in these two Figures.

The Cup-boards A, are opened according to the Orders of the Win-
dows, and it would be loss of time to busie Ones-self in repeating them
here, we are to observe only, that one height is Parallel to the Horizon,
and the other below draweth to the point of distance B.

This Manner of Shop, which is on the other side, hath its Opening
with two Shuts, whereof one is lifted on high, and the other cometh
down below, and each maketh its demi-round from the Center C and D
which one maketh with the Compasses then we may take the Openings
where we will, as here at the point E, from which we draw a Ray to
the point of sight F, untill we divide the demi-rounds of the other end,
at the point G, from which points E G, we must draw to the Centers
C D, for to have the Shuts, which close up the Shop as we see.

In the figure below, there are 3 Chests opened several ways for to open
the first H, I have made the quarter of a round M, in Perspective, follow-
ing the Measure of the little squares of the Plane, keeping the bredth
of the Chest, as this is of 2 little squares, from which we must raise Per-
pendiculars, and thereof frame the half or quarter of a Round, for the
opening which we may take at pleasure, as here the point N, from
which we must draw a Parallel unto the other quarter of the round O,
and from these 2 points N O, to draw to the Center P, If we would
open it wider, we must make a demi-round instead of a quarter.

The Chest I, is the most easie of all the Openings ; for having taken
the bredth of the Chest Q R, we must from the center R, make with
the Compasses the demi-round Q S.　Then to take what opening you
will, as T, and to draw a Ray to the point of sight V, which shall di-
vide the other demi-round at the point X, and from these 2 points T X,
to the corners R.

He that would open them further, hath but to set the point of the o-
pening higher, within the demi-rounds as Y, is to the Coffer K; All the
rest is ordered like as in the Coffer I, as one may see.

A

F

A

G
E
C
C
B
G
D

M
N
O
R
S
Y
X
S
T
R

H
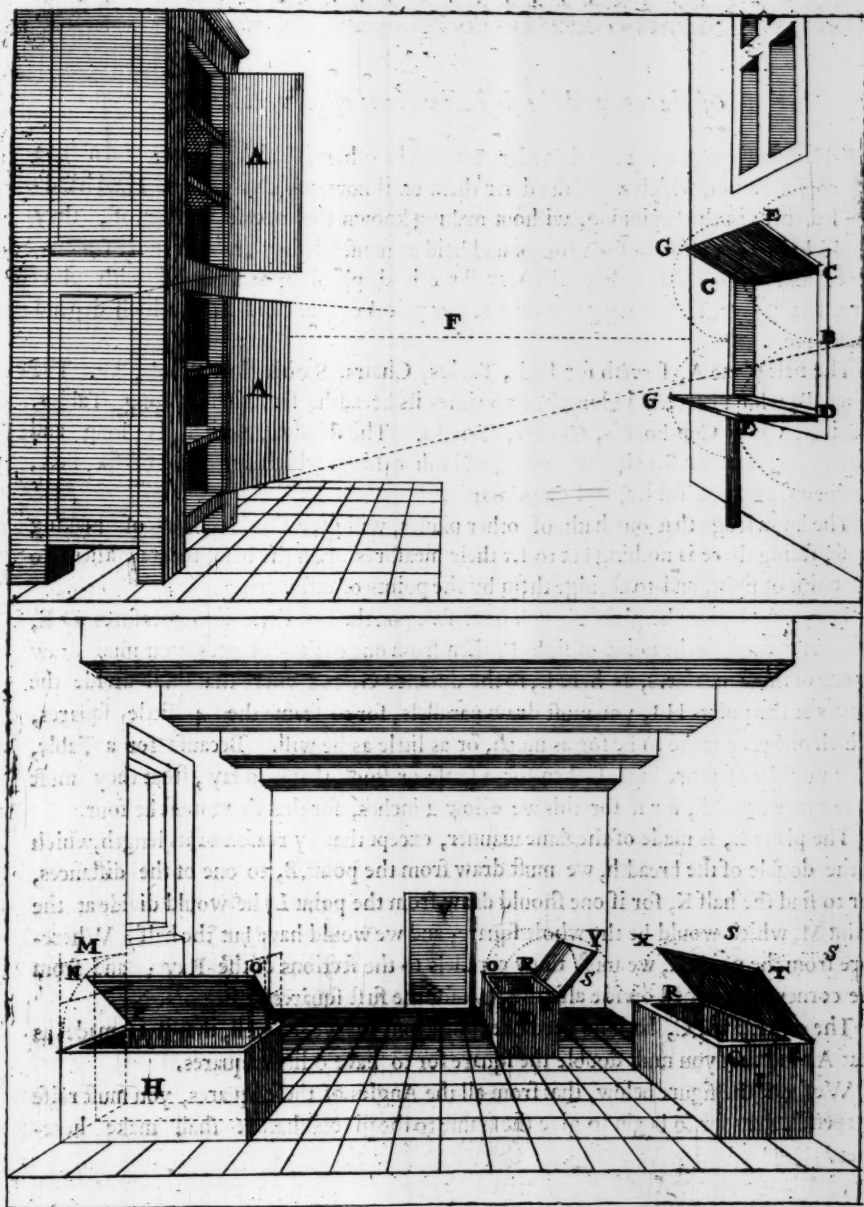
Of planes, and the first elevations of moveables.

I Had set these planes in their order, among the others, had there not been one consideration, which made me defer them until now, which is, that if I had handled them in the beginning, without making known the necessity thereof, they would have been also too soon forgot and held as unuseful: they are now more seasonable, and without doubt they will be well received, pleasing, and learned with pleasure, seeing there are not only moveables, nor peices of houshold-stuff, which depend not thereon.

The first plane A, serveth for Beds, Tables, Chairs, Stools, low Stools, &c. The other B, which beareth in length, two times its breadth, serveth for long Tables, Cabinet, Court Cup-boards, Coffers, Trunks. The third C, which is long and narrow, serveth for Benches or Forms, and other things which have need of six Feet, or Pillars, as great Tables, and Cup-boards.

The knowledge that one hath of other planes, will give the facility of making these, seeing there is nothing but to set their measures upon the base, to draw them to the point of sight, and to abridge them by the points of distances.

For example, for the plane A, you must set upon the base these two measures D E, and draw them to the point of sight F, then from one of the distances, you must draw to one of these measures, as here E, to the distance G, and where that shall divide the Rayes at the points H I, you must draw parallels, for to frame the 4 little squares, which one may make to be for as much, or as little as he will. Because for a Table, they must be of more bigness then for a settle or stool, that is to say, that they must have more breadth, for if for this we allow 2 inches, for that there must be four.

The plane B, is made of the same manner, except that by reason of its length, which is the double of the breadth, we must draw from the point B, to one of the distances, for to find the half K, for if one should draw from the point L, he would divide at the point M, which would be the whole square; and we would have but the half. Wherefore from the point K, we must draw parallels to the sections of the Ray; and from the corner L, we shall divide also the Ray for the first squares at the point N.

The other plane C, hath no need of explication, for we see well, that it is made as that A, and that you must double the square for to have 6 little squares.

We see at the figure below, that from all the Angles of these squares, you must raise Perpendiculars for to begin to give the frame to the pieces that we shall make hereafter.
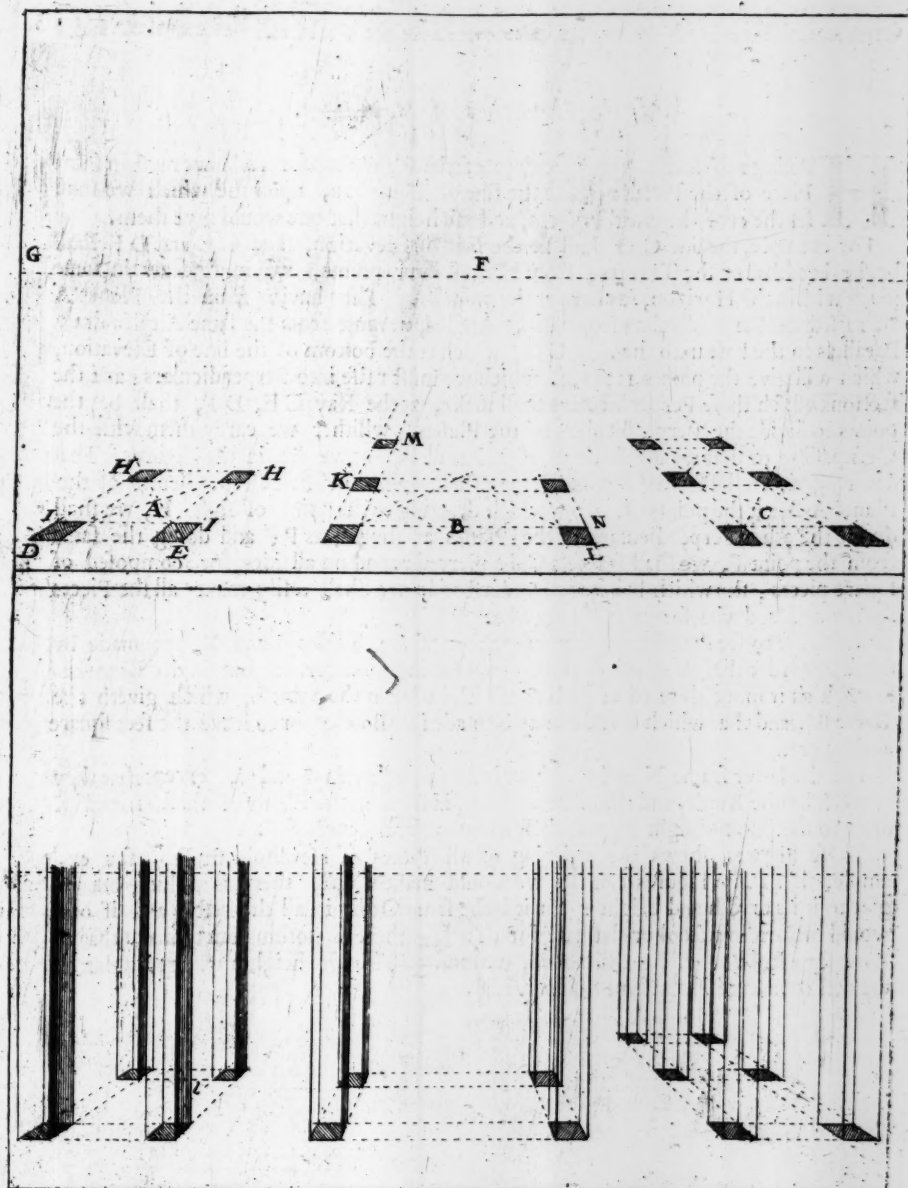
Of the Elevation of Moveables.

Having raised the Perpendiculars of the Plane, as aforesaid, we must in some Place of the Picture make the line of Elevation, upon the which we shall set the cross-lines or Travers, and the height that one would give them.

For example, the line C D shall be the line of Elevation, and C E and D F shall be the bredths for the Travers; from all these four points, we must draw in some place within the Horizon, as here at the point G. Then having from the Planes A B, raised the Perpendiculars from all the Angles, we must from the same Angles draw Parallels to the base unto the Ray C G, which is the bottom of the line of Elevation, which will give the points 1,2,3,4. which we must raise into Perpendiculars; and the sections which these Perpendiculars shall make, at the Ray C E, D F, shall be the points to divide the Perpendiculars of the Planes, whither we carry them with the Compasses, or that we divide them with Parallels, as we see in the Figure. That drawing a Parallel from the point E, we shall divide the first Perpendicules of the Planes A B, at the points O, from which drawing to the point of sight H, we shall divide the other Perpendiculars of the Planes at the points P; and doing the same from the point F, we shall frame a Cube pierced round on all sides, or composed of square pieces; the which being well understood, we shall easily make all the Pieces following, and whatsoever other may be.

It is easie to see that the two frames or feet of the Tables I and K, are made by the same Order that those above A B, they having no difference but in the Barre below, which is more elevated in the line of Elevation at the point L, which giveth the Barre M, and that which is under may be made into Bowles, or to leave the feet square as they are.

For the latter frame N and Q, there is no more then in I and K, except that they are seen by the Angle, and the others are seen in front: the Planes of these I and K draw to the point of sight R, and these draw to the distances S T.

These Figures shews the ordering of all Pieces of Houshold-stuffe; for example, if of the Figures I or K, we would make a bed, there is nothing but to give to it its bredth and height: for it is the same Order in all the rest; and if one would make a low stool or flat base for a Table; there is nothing but to make that above for a stool; besides that above, we must give it more height then bredth, but all the rest is ordered in the same manner.

✿✿✿✿✿✿✿✿✿✿✿✿✿✿✿✿✿✿✿✿✿✿✿✿✿✿✿✿✿✿✿✿✿✿✿
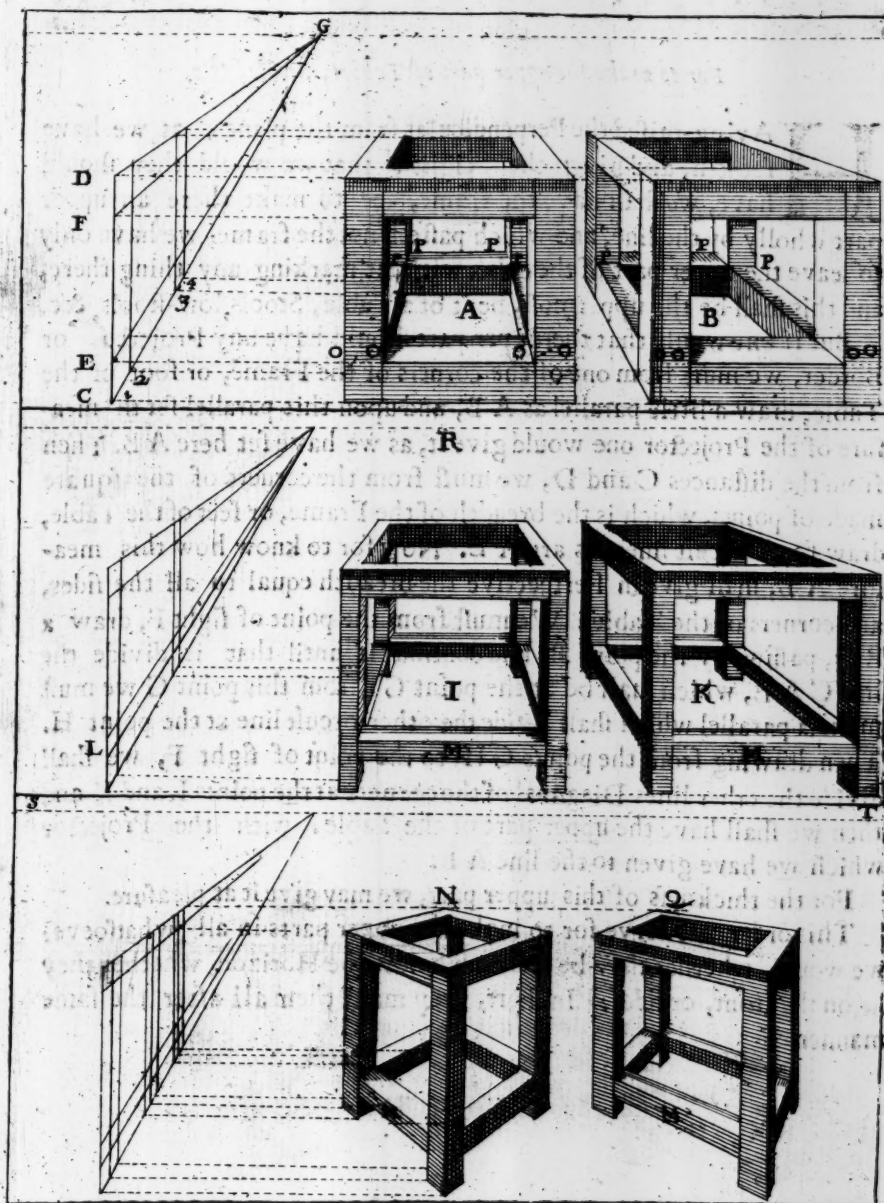
For to make the upper part of Tables, Stools, &c.

HAving raised the Perpendicules from the plane, as we have
spoken, and given the height, that we would they should
have, we shall have the frame, for to make there an upper
part wholly by the line, and which passeth not the frame; we have only
to leave the upper part of the cube, without marking any thing there,
and this shall be the uppermost, be it of a Table, Stools, low-stools, &c.

But if one would that the upper part should have any Projector or
Border, we must from one of the corners of the Frame, or foot of the
Table, draw a little parallel as A B, and upon this parallel set th mea-
sure of the Projector one would give it, as we have set here A B. Then
from the distances C and D, we must from the corners of the square
made of points, which is the breadth of the Frame, or feet of the Table,
draw small occult lines, as are A E. Now for to know how this mea-
sure A B, shall give in Perspective the breadth equal to all the sides,
and corners of the Table; We must from the point of sight F, draw a
Ray, passing by the point B, and continue it until that it divide the
line C A E, which shall be at the point G; from this point G we must
make a parallel which shall divide the other occult line at the point H.
Then drawing from the points G H, to the point of sight F, we shall
divide the other lines Diagonal of the corners at the points L and K, and
then we shall have the upper part of the Table, with the Projector
which we have given to the line A B.

For the thickness of this upper part, we may give it at pleasure.

This order may serve for to make the upper parts in all whatsoever
we would, whether they be above or below the Horizon, whether they
be on the front, or sides; In short, they make them all after the same
manner.
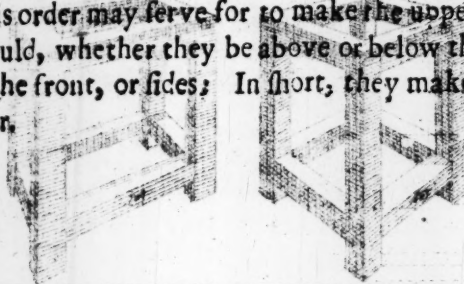
For to Elevate a Court-Cupboard and Cabinet.

HAving made the Plane, and Elevated Perpendiculars from all
the Angles, as we have said, we shall set upon the line A B,
which shall serve here for the line of Elevation, the Measures
that we will give, as well to the distance of the boards, as in their thick-
ness, as are C D E, from the which points C D E, we must draw Pa-
rallels to the Base, unto the other Ascent or Column F G. Then from
the points which shall be marked upon this Ascent G F, we must draw
Rays to the point of sight H, unto the other Ascent of the Hollow I K.
This Hollow is given at pleasure, setting upon the base, that which we
will give it; for example, for to have the hollow or bredth of this
Cupboard, I have set the Measure F L, from this point L, we must
draw to the distance M, and where the Ray F H shall be divided at the
point L, that shall be the place of the last Ascent.

The Cup-board which is over against on the other side, is ordered
in the same manner, and for to finde the Measure of this little Cabinet
which is in the midst, bore up by two little Columns, we must take the
points L P, which are in the midst of Q N, and the bredth of the little
Cabinet, and draw them to the distance O; and where the Ray N H
shall be divided, we must draw Parallels to the base, which shall divide
the Ray T H at the point V, from which raising Perpendiculars, we
shall have for the little Cabinet of the middle.

The great Cabinet of the second figure, are of the same Order with
the Court Cup-boards above. There is none but that of the midst,
which is at the bottom, which we must a little explain, by reason that
it is of the front, and that one might be in some trouble for to deter-
mine its hollow, I say then, we must frame its Plane, as we have said
heretofore, and as we see it finished in the half; for to give it the Tra-
verses equal to the first in the fore-part; we must from the first Ascent
R, draw occult Rays to the first Perpendicular of the hollow S, and
there to make little sections, from which we must draw little Paralels
to the base; and we shall have that we desire.
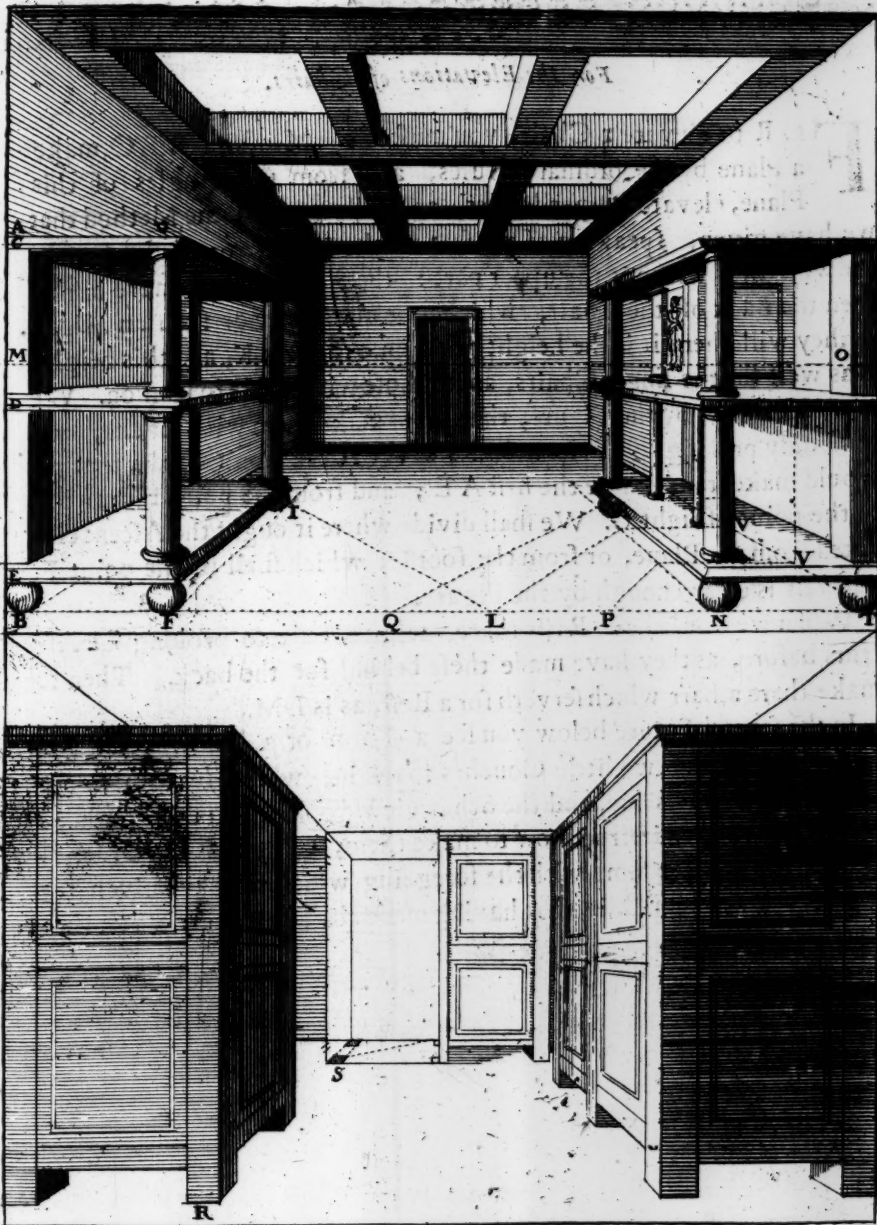
For the Elevations of Chairs.

FOR to elevate a Chair, you must of the Measures A B C, make a Plane by the ordinary Rules, and from the Angles of this Plane, elevate Perpendicules, and follow the same Method that we have given, speaking of the feet of the Table, or of the frames for windows, without the upper part: there is nothing more in this then the Back of the Chair, which one may make of such an height as they will: here it is the height of A, unto the seat K, and this height is as well for the single Chairs, as for those with Rests to lean on. We see sufficiently by the Figure, that for to make them with backs, we must only prolong the Perpendicules of the Ascents on the side, that we would make it, as is here the first A E; and from the point E drawing to the point of sight G. We shall divide where it ought the Ascent elevated from the Plane, or from the foot H, which shall be the point F. The rest is clear enough by the Figure.

When we would have Rests there, we need only to prolong the Ascents before, as they have made these behind for the back. Then to make there a Barr which serveth for a Rest, as is L M.

In the second Figure below you see a Form or a Bench garnished with carving, and two little Couches to rest in, whereof one hath the back turned on this side, and the other view'd obliquely: It would be to lose the time to instruct how to make them, seeing that the Order to elevate them, is the same with the foregoing, which we have given for the Moveables, which is, that having made the Plane, we must elevate Perpendiculars, &c.

Cciij.
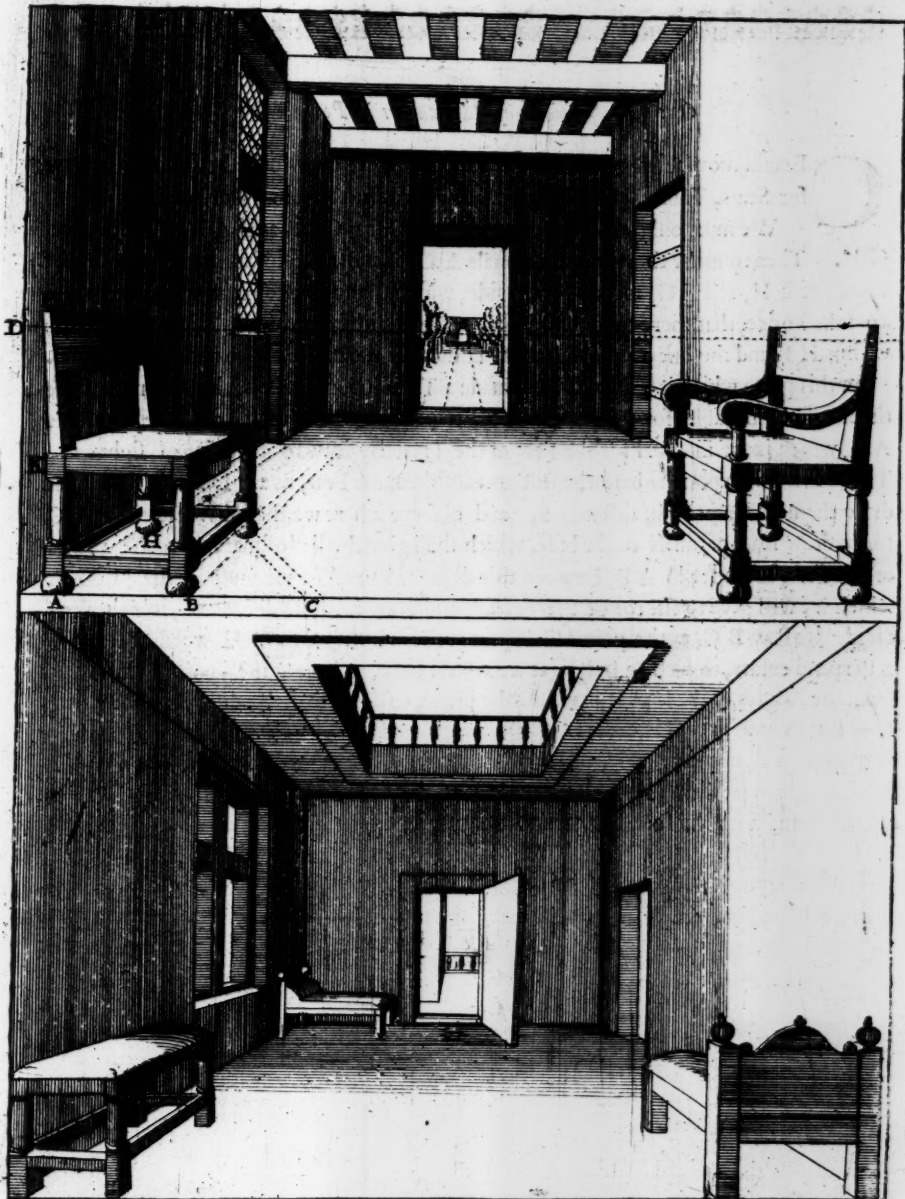
One other fashions of Moveables in Perspective.

Ertain moveables, which close themselves. Those which they make to serve for Seats, Tables, and Beds, &c. are very easie to set into Perspective.

We must only make the elevation, as if for a Cube, as is A B, C D, or E F G H. Then to make there two Diagonals A C, and B D, for that of the midst of the Front, or E H, and F G, for that of the side, which shall serve to bring in the 2 crosses, to take notice, that there be an half which entreth within the other, as G K, do pass within H I; and the one and the other are fastned by the midst for to make them bend.

In this piece which is below, I have made a Table upon Tressels, that we may have the smallest moveables for to set them into Perspective. We must from the measures A B, which is the interval for the Feet of the Tressels, draw to the point of sight C. Then having set upon the base the thickness of the same Feet, as are D and E, we must draw them to the point of distance F, and observe where we shall divide the Ray B C for to draw little parallels to the base, which shall give the little squares, or the planes of the Feet, as we see in A B, between this distance D and E, we must set the breadth, which we will give to the top of the Tressel, and draw it to the distance F, which shall divide the Ray B C, at the points G H, from the which points G H, we must elevate 2 Perpendiculars, to such an height as we would have, as here at the point I. Then from the Angles of the small squares of the plane, to draw lines bending unto the piece I. The second Tressel is ordered all alike with the first

The form K, nor the Table, or high Stool L, have no need of Explication, nor Instruction for to set them into order, seeing that they have nothing, which is not common to them, with the fore-said pieces.
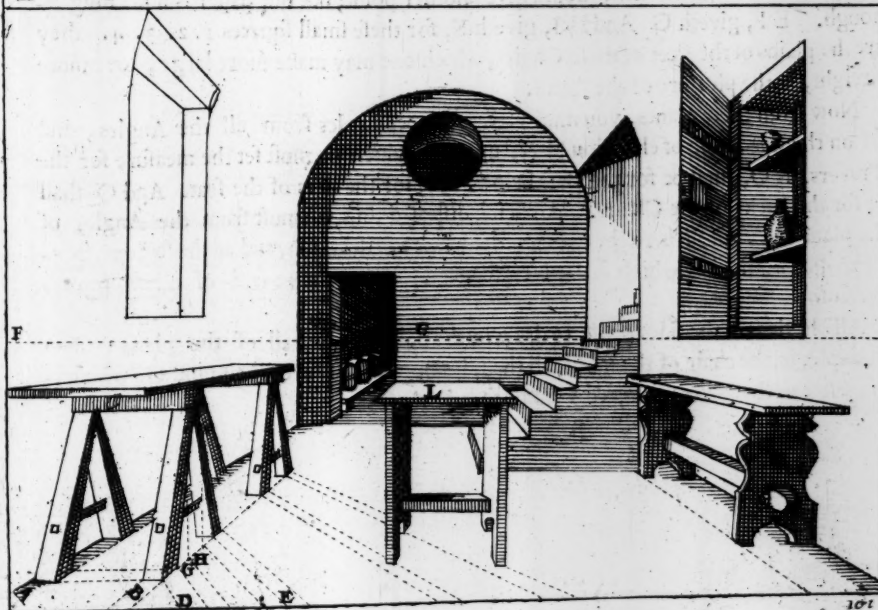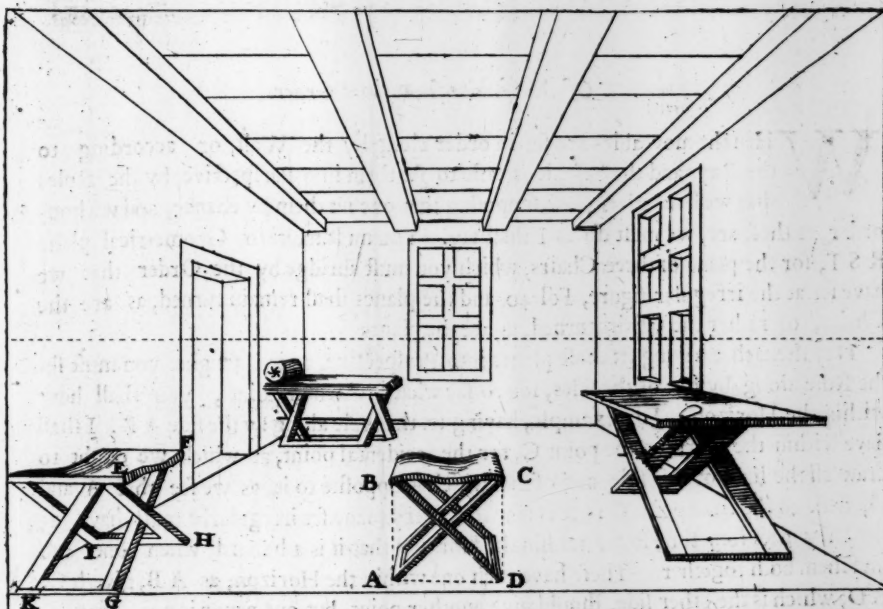
Of Moveables set without Order.

WHen the moveables are set in order along by the Wall, or according to the Rays and the base, it is easie to set them into Perspective, by the Rules that we have given; but supposing that one set them by chance, and without order, as these are, we must do as I shall say. You must make the Geometrical plane R S T, for the plane of three Chairs, which you must abridge by the Order that we have set at the irregular figure, Fol 40. and the planes shall remain turned, as are the Chairs, or rather the Chairs turned, as are the planes.

I say then, that having set these planes into Perspective, as it is taught, you must set the Rule along by one of the sides, for to see what accidental point, you shall have within the Horizon : For example, having set the Rule along by the side A B, I shall have within the Horizon the point C, for the accidental point, at which we ought to draw all the lines of this side, and of that which is opposite to it, as we see that A and D, draw to the same point C : It is true that every plane set irregularly must have 2; But they meet sometime so far within the Horizon that it is a hazard when one can find them both together These have each one within the Horizon, as A B, giveth C. A D, which is the other side, should give another point, but our paper is not long enough. E F, giveth G And H I, giveth K, for these small squares 1. 2. 3. 4. they are the plains of the Feet of these Chairs, which one may make more large, or more streight, at the pleasure of the Artist.

Now from these planes, you must elevate Perpendicules from all the Angles, and set on the side a line of elevation M N, upon the which we must set the measure for the Travers, as O, shall be for the Bars below. P, for the bars of the seat. And Q shall be for the backs of the Chairs. All being disposed thus, we must from the Angles of the plane draw parallels to the base, unto the line of Elevation, and at the section to elevate Perpendicules, which shall give the measures, as we have said of other figures heretofore.

All the lines of the sides ought to draw to the point accidentall of the plane : For example, in the chair of the midst, all the sides ought to draw to the point G, which is the point of the plane, as I make it to be seen in the figure.
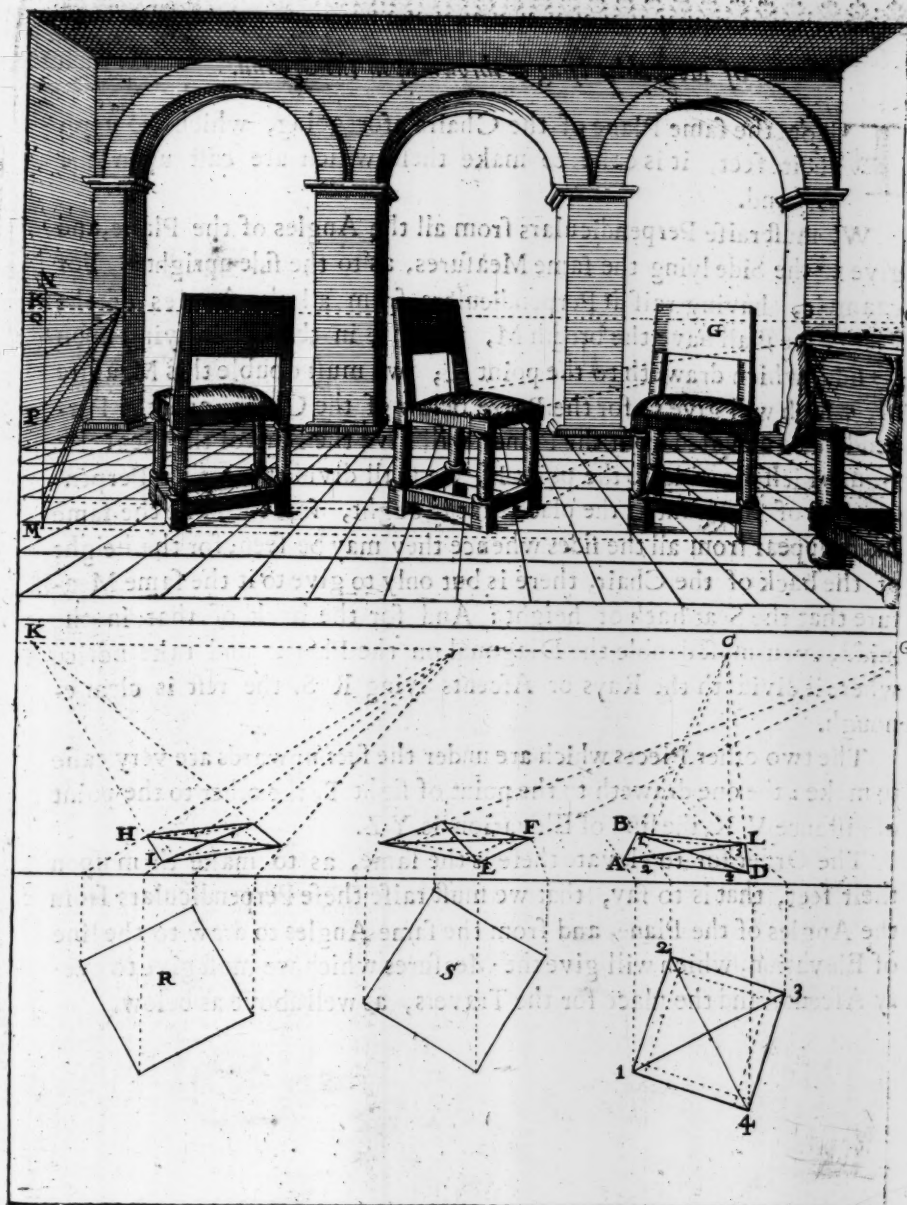
Of Moveables lying or thrown upon the Ground.

FRom the same Plane of the Chairs aforegoing, which are upon their feet, it is easie to make these which are cast upon the Ground.

We must raise Perpendiculars from all the Angles of the Plane, and give to the Side lying the same Measures, as to the side upright: For example, having rais'd Perpendiculars from all the Angles of the Plane, we shall have the bredth M, which is in the Chair lying upon its side, which draweth to the point K; we must double this Measure M, which will give O for the Barre below of the Chair, and the Perpendicules elevated from the Plane, will give the Barr of the Seat P, from which drawing to the point K, we shall divide the other Perpendiculars of the front at the place that it ought, for to make the same Barrs appear from all the sides whence they may be seen; for the height of the back of the Chair, there is but only to give to it the same Measure that the Seat hath of height: And for the back of that in the midst, you must double the Diagonal on the Plane, and take notice where it divideth the Rays or Ascents lying R S. the rest is clear enough.

The two other Pieces which are under the feet upwards are very easie to make: the one draweth to the point of sight T, the other to the point of distance V X, the line of Elevation is Y Z.

The Order for to elevate these is the same, as to make them upon their feet, that is to say, that we must raise these Perpendiculars from the Angles of the Plane, and from the same Angles to draw to the line of Elevation, which will give the Measures which we must give to every Ascent, and the place for the Travers, as well above as below.

For to set Altars into Perspective.

THE Order of Altars, is the same with that of the frames of a long Table : that which is more in this, is the Round of the midst, the Borders of the Table-cloth, and the Laces which shall be found in their place, doing that which followeth.

First, for the body of the Altar, which we see in front there is no difficulty : for having given to it the height and length, there is nothing but to draw from all the points above the base, to the point of sight E, and from the sections that these points shall give to the line of the bottom of the Altar, you must raise Perpendicules for the Round of the midst, it is made with the Compass. The rest is clear enough within the Figure.

For to make an Altar on the side, we must set the bredth and height, which we should give it at the place where we would begin it, as is A B the bredth, and B D the height. Then from B D and C to draw to the point of sight E, seeing that B F is the length of the body of the Altar, and that we would give the same to this, we must from the point F draw to the distance G, and take notice where we shall divide the Ray B E, and from the section elevate a little Perpendicular, until that it touch the Ray D at the point H, and from H to make a little Parallel, which shall give I at the Ray C, and then we shall have the upper part of the Altar C D H I : for to have these two laces which are on one part, and the other of the Round : the points K L will give them upon the Ray B E, by drawing them to the distance G, and M will give the bredth of the Borders of the Table-cloth ; and having taken the measure B M, we must bring it to D, which will give O, for the bredth of the Border of the Table-cloth on high   As concerning the Round, I will not repeat that, for I have spoke of it elsewhere, where any may have learned, how it is set into Perspective, it is enough that we know, that from all the divisions we must draw to the distance G : And at the sections of the Ray B to raise Perpendicules ; then to take these same Measures, and transport them from B unto O, as are P ; And from all these Measures to draw to the point of sight E, and to observe where they shall divide the occult Perpendiculars, for to make by these points a crooked line, which shall give the Rounds in Perspective. If in stead of these laces, and of the Round, there were an Embroidery, we should use the same Order for to abbreviate it

In the Figure below I have made the same Altar without line, and adorned with a Cross and two Candlesticks ; for to finde the place of these Candlesticks, we must prolong the line of the corner of the Altar, as is Q R ; then from the distance G draw a line by the corner of the Altar T, and to continue it until that it divide that Q R ; and this line Q R shall be the length of the Altar, equal to B F of the first figure, upon the which we shall set the Measures of the Cross and of the Candlesticks, as are V for the Cross, and S for the Candlesticks ; from all these points S V we must draw to the distance G, and take notice that at the sections of the Ray Q E, we must draw little Parallels, which we shall divide by the Ray S E, and will give the squares above the Altar X for the Cross   We must leave the square for the foot, and from the midst of the square elevate the Cross ; for to finde the Measure of the Arms of the Cross, we must from the corners of the square raise the occult Perpendiculars, as it is mark'd Y, and draw to the point of sight E for the Candlesticks   Of this square we must make a Round; and observe where it shall divide the Diagonal, for to elevate these Perpendicules, which shall give the bredth of the Basons, from the which we must draw to the point of sight E, from the middle square or round foot of the Candlestick, we must elevate a Perpendicular for the Body of the Candlestick, and for the Taper which we shall make as high as we will: for to proportion it, we must from the top of the first draw to the point of sight E, the rest hath already been said : the Figure will cause us to remember the Orders.
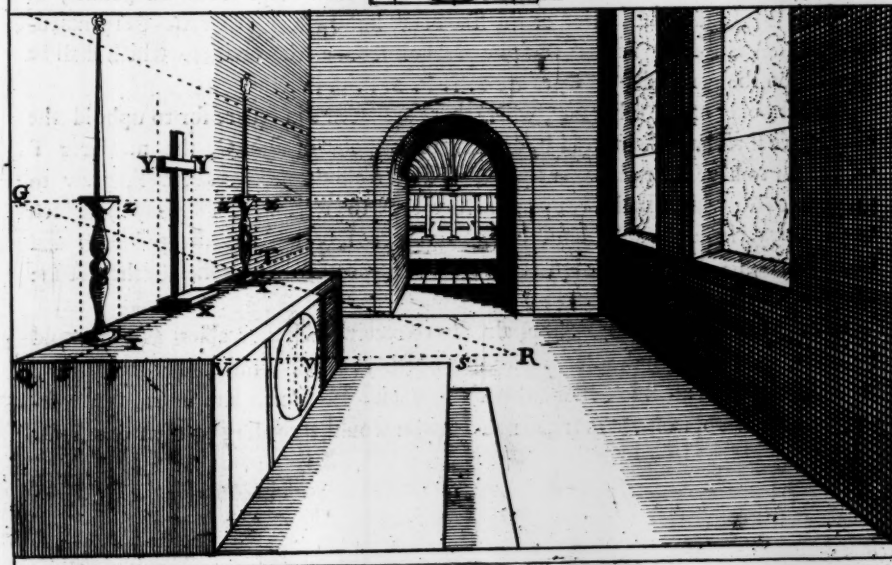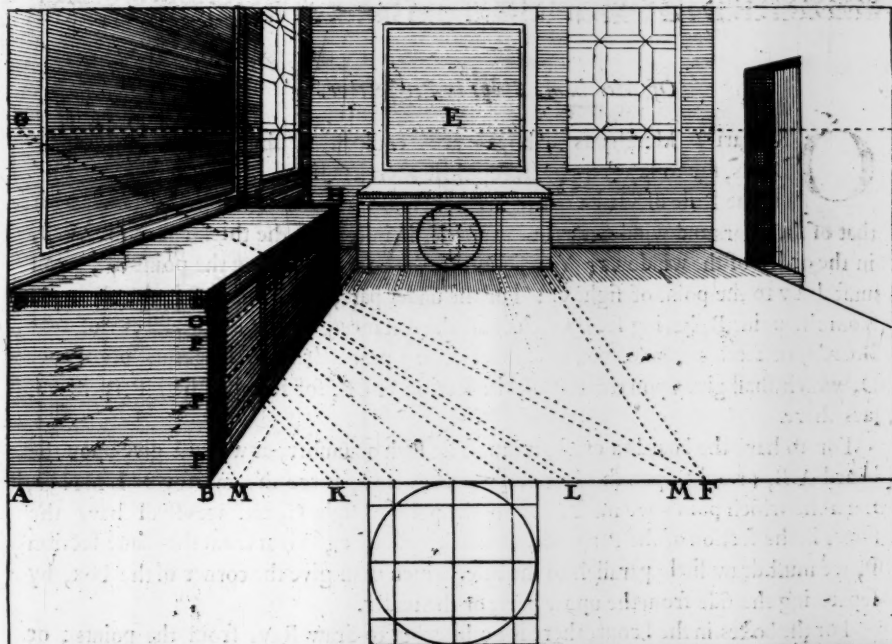
Of Merchants Shops in Perspective.

Ordinarily Merchants Shops are compassed about with Shelves or Boxes, for to lay there and keep their Merchandize.

The Rule or Order for to make these Boxes, is as it were the same with that of the doors and windows: For example, if instead of the thickness of the Wall, in the order of the windows; You set in this the board A B from the point B, you must draw to the point of sight C: For the under part, or bottom of the Boards, from the point B, having set upon the base the distances, and the measures of the Boards, or ascents E F G, you must from these 3 points draw to the points of distance D, which shall give upon the Ray B, the section H I K, for to raise the Perpendiculars there.

For to have the boards a cross, we must set such a number, as we will give upon the board A B, or only upon the first Perpendicule B O, as are the measures L M N O, from the which points we must draw to the point of sight C, and we shall have the boxes in the section of the Perpendicules at the points P; Then from the same section P, we must draw little parallels to the base, which shall give the corner of the box, by separating the side from the upper part, or the under.

For the boxes in the Front, there is nothing but to draw Rays from the points, or measures E F, and at the section of the line of the hollow K Q, to raise Perpendiculars R S; And for the Travers to draw parallels from all the divisions which shall be found upon the Perpendicule K, as are P. 1. P. 2. P. 3. P. 4.

For the boxes of the other side, where there are ascents in square for to uphold the boards, we shall have their breadth, drawing to the point of sight C, the measures T G, and for to have their plane, or square, we must from the measures A E F, draw to the distance V, which shall give upon the Ray T C, the section, X Y Q, by the which we must draw little parallels, until that we divide the Ray T G, at the point Z. and from the Angles of these little squares to raise Perpendicules which shall be the ascents: as we see clearly in the figure.

The figure below sheweth a Shop, already to receive such moveables, as one would put there, and to furnish the Boxes with that which you shall please. For a Library, we must fill them with Books. For an Apothecary with little Boxes, and Pots. For a Mercer, with bundles of stuffs. In short, for all that you would, according to their occasions.

✤✤✤✤✤✤✤✤✤✤✤✤✤✤✤✤✤✤✤✤✤✤✤✤
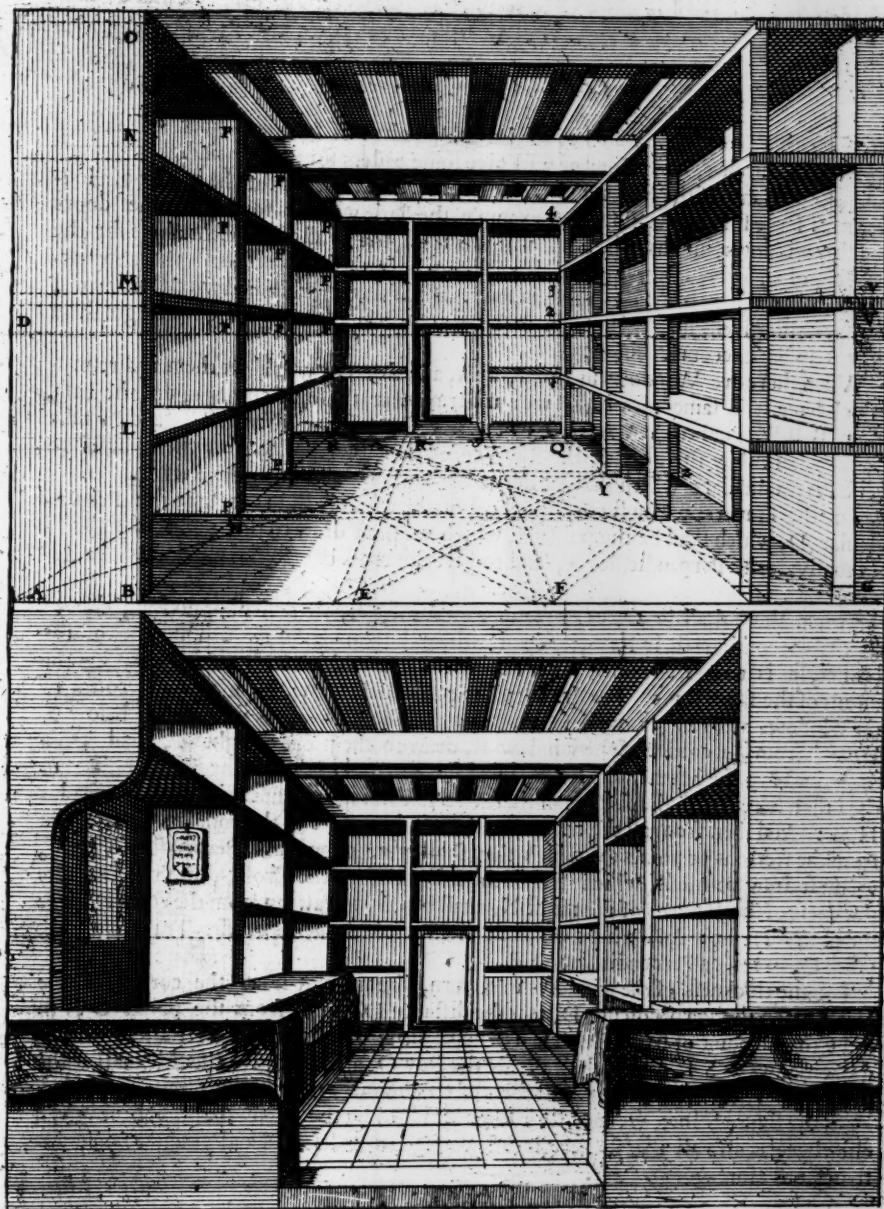
Of the out-side of Buildings.

HItherto we have spoken of all that belongeth to the in side of houses, buildings Churches, &c. Now we will give some orders for the out-side.

Many of the Rules and Orders, that we have given for the in-side of Houses, may serve for the out-side. For example, the Rule which is for to set the doors and the windows, in what place one would within, the Wall is sufficient alone for the out-side of all sorts of buildings, seeing that on the out-side of the house; there appeareth no other thing then doors and windows. But if they be enriched with Ornaments, we have also given, how they ought to be set into Perspective, if any have forgot them they may have recourse thither.

When there are Windows in Front, as A, and that one would set them in a return, which have the same measures, we must transport these measures upon the base, as are B B B, equal to A A A, to draw them to the point of distance C, and to take notice where they shall divide the Ray D E, at the points F, and from these points to raise Perpendiculars which shall be the ascents of the windows in the Return.

For the Travers, we must continue those of the window in Front, unto the Perpendicular D, which shall be the points I, which we must draw to the point of sight E, for to divide the Perpendicules F, and to give the cross bars to the window of the Return.

When there shall be a greater number of Windows, there shall be nothing else to do, but to continue their Rays, for to give them the same measure and height of the crosses, as is to be seen on the other side, at the house which hath 2 windows, by the means of the same Rays   For the breadth or thickness of the Jawmbs, and crosses of the windows in Front, we must set it upon one of the Travers, as it is at that below K H, and from the corner of the window K, draw to the point of sight E, and from the point H to the distance C, for the window A. And to the distance L, for that of the other side, and at the section of these two last lines, we must raise a Perpendicular H M: And then from all the corners of the window draw to the point of sight   And from the sections or points Q, which they shall give upon this Perpendicule H M, we must draw parallels, which shall be the thicknesses of the Crosses, or Travers: The thickness of the Jawmbs of the midst N, shall be taken drawing from the corner N, to the point of sight : And where we shall divide the thicknesses of the Travers at the point Q, to raise a Perpendicular Q R.

For the thickness of the windows in Return, you must set it at the corner of the Wall, upon the Perpendicule D, as is the distance I O, and from the points O, to draw to the point of sight E   Then to make little parallels from all the corners of the windows as S T, which shall divide the Ray O, and shall give the thickness at the point S.   These rules serve for all sorts of windows, be they high or low.

In the figure below, we may see a door abridged by the order that we have given elsewhere: as also all that is there, is easie enough to understand and practice by the instructions afore-going.

E

M
I

IIK

F F
F

A A A   B B B

106
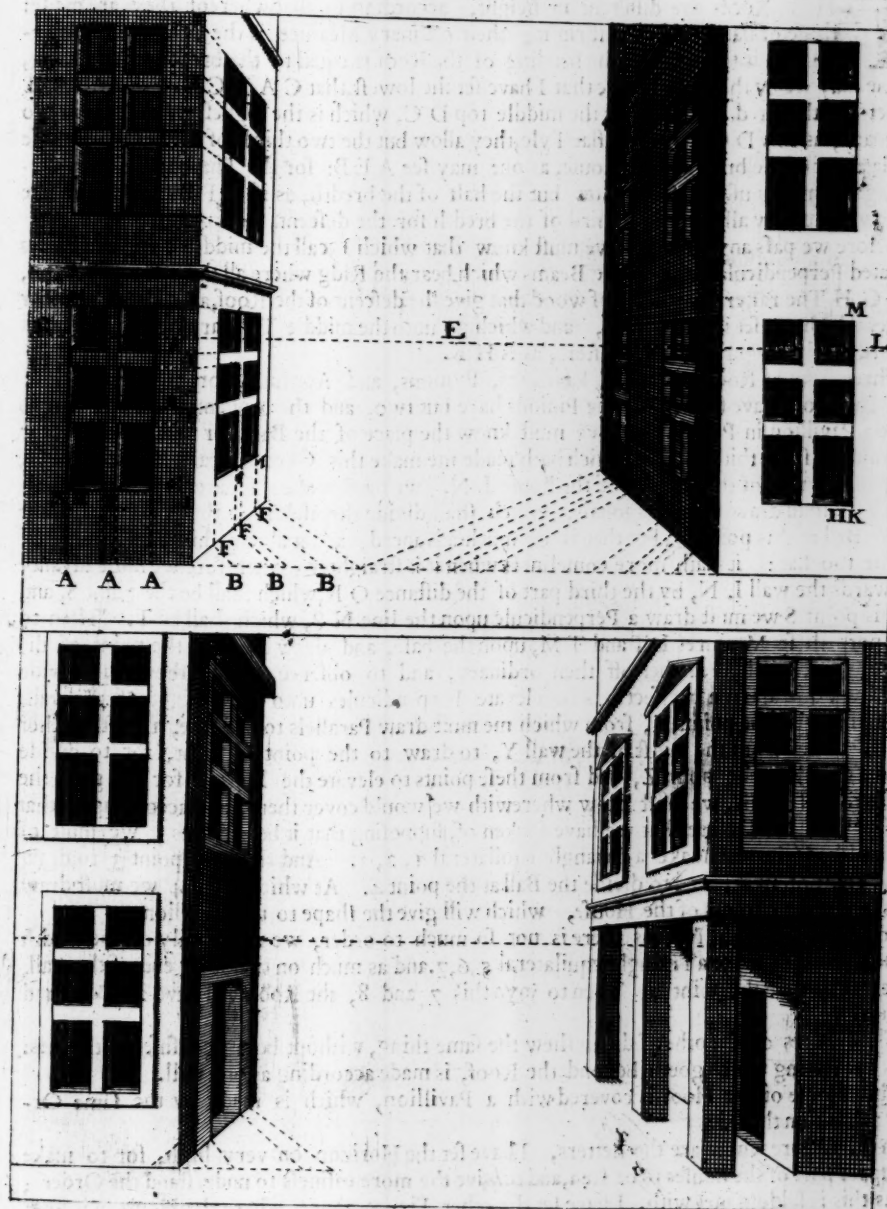
For to set the Roofs of Houses in Perspective.

THE Roofs are different in height, according to that whereof they are made: those of flate are the moſt right; their ordinary Meaſure is the Triangle Equilateral, that is to ſay, that the bending of the Roof is equal to the bredth of the houſe, as one may ſee by the little Figure that I have ſet the loweſt, that C A or C B is equal to A B. Others ſet this bredth A B, for the middle top D C, which is the higheſt, but that is not ſo ordinary, as this D C : for the flat Tyle, they allow but the two thirds of the height of thoſe of Slate, or of the bredth of the houſe, as one may ſee A E B: for the Thatch, which is a Covering commonly uſed, they allow but the half of the bredth, as if A F B. And for the hollow Tyle, they allow only a third of the bredth for the deſcent, as is A 9 B.

Before we paſs any farther, we muſt know that which I call the middle Top, are Pieces elevated Perpendicularly upon the Beams which bear the Ridg where all the rafters do meet, as is G H. The rafters are pieces of wood that give the deſcent of the Roof, as is H I. The other Pieces which are ſet in the corner, and which go unto the middle Top, are called Stays, and are ordinarily longer then the Rafters, as is H K.

Three ſorts of Roofs are in uſe, Pavilions, Pynions, and Appentis, or Pent-houſe like. The Pavilions have four ſides, the Pinions have but two, and the Appentis but one; for to make a Pavillion in Perſpective, we muſt know the place of the Balls or middle tops, for to draw the ſtays thither : the which hath made me make this Geometrical Plane L M N O, for to ſhew that of the bredth of the houſe L N, we muſt make a ſquare L M N P, from which we ſhall draw two Diagonals, which ſhall divide themſelves at the point Q : ſome ſet the Ball at this point Q, but that is too much advanced, and maketh this bending of the end lie too flat : it hath more comelineſs when it is ſtraighter ; wherefore we muſt advance it towards the wall L N, by the third part of the diſtance Q R, which ſhall be the point S, and by this point S we muſt draw a Perpendicule upon the line N P, which ſhall be T. Then to tranſport theſe Meaſures L T and T M, upon the baſe, and draw them to the point of diſtance, which is here farther off then ordinary, and to obſerve where they ſhall divide the Ray V ; and from the ſections to elevate Perpendicules unto the height of the wall, which ſhall give the points X, from which me muſt draw Parallels to the baſe, unto the other Ray I. Then from the midſt of the wall Y, to draw to the point of ſight, for to divide thoſe Parallels at the point Z, and from theſe points to elevate the Balls ; for to give the height to theſe Balls, we muſt know wherewith we would cover them, and according to that to give them the Meaſure that we have ſpoken of, ſuppoſing that it be of Slates ; we muſt of the bredth of the wall make a Triangle equilateral 1, 2, 3. And from the point 3 to draw to the point of ſight, and to divide the Ball at the point 4. At which point 4 we muſt draw lines from the corners of the Houſe, which will give the ſhape to the Pavillion.

For the Roofs with Pinions there is not ſo much to order, we muſt only of the bredth of the wall 5, 6, make a Triangle equilateral 5, 6, 7. and as much on the other end of the wall, which ſhall give the point 8. Then to joyn this 7 and 8, the Roof will have its ſhape and its meaſure.

The Figures on the other ſide do ſhew the ſame thing, without being confuſed with lines: This projecting which goeth beyond the Roof, is made according as one will.

This Houſe on the Floor is covered with a Pavillion, which is made by the ſame Orders as that on the ſide.

In this Figure where are the Letters, I have ſet the Horizon on very high, for to make the upper part of the houſes to be ſeen, and to give the more eaſineſs to underſtand the Order ; but as this is ſeldom met with, I have ſet the other Figure above, where the Horizon is low, as it is ordinarily, which nevertheleſs is not therefore any other Rule for to make the Roof, then that below, as one may ſee by the Figure.

L T M T

R S Q S

N P

O A D B I G

E F 9

Slate
Flat Tile
Thach
Pan Tile

H K
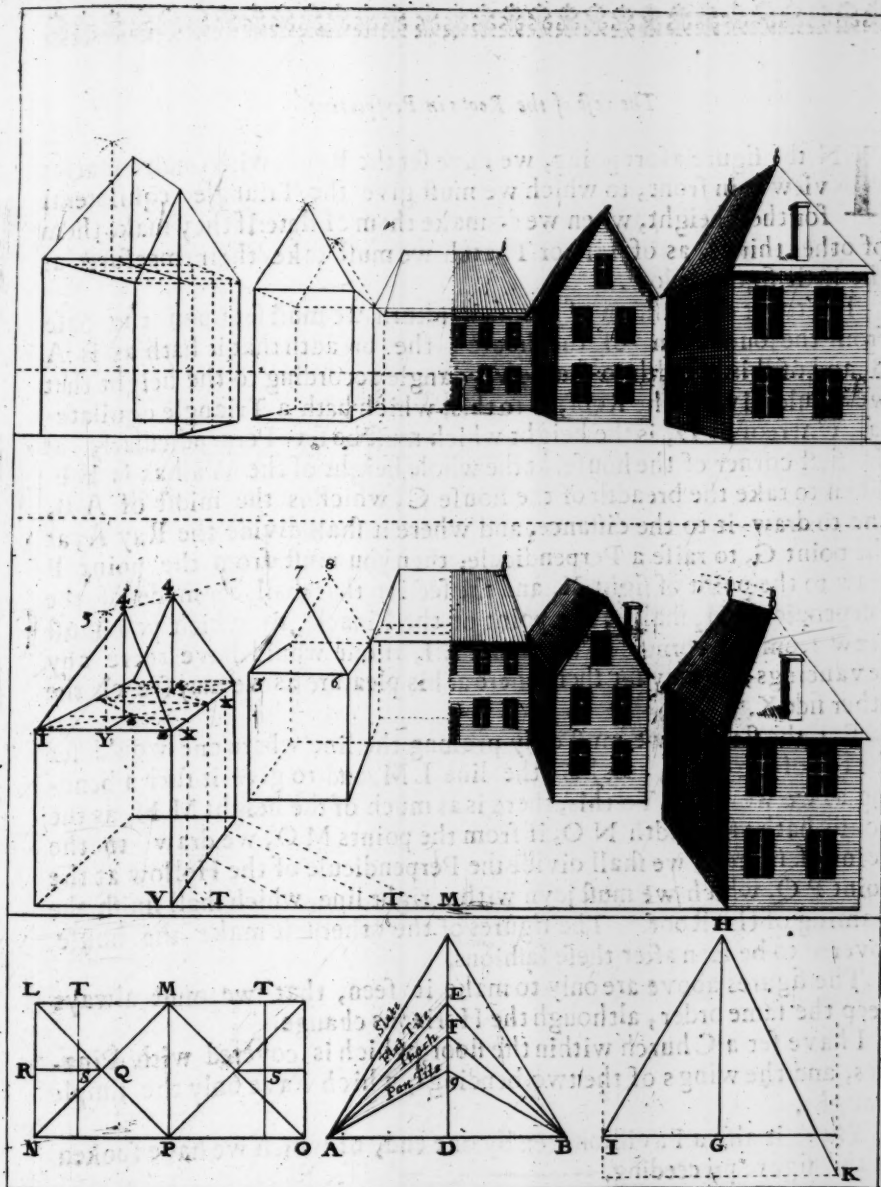
The rest of the Roofs in Perspective.

IN the figure aforegoing, we have set the Roofs with small Pinacles view'd in front, to which we must give the Triangle equilateral for their height, when we do make them of slate: If they make them of other things, as of Tile or Thatch we must take their measures at the little figure below.

For to set this fashion of Roofs in return we must set upon the base from the foundation of the house, the breadth that it hath as is A B, and of this breadth to frame a Triangle according to the height that we would give to the Roof, as to this, which hath a Triangle equilateral, whereof C D, is the height which must be set Perpendicularly at the first corner of the house, at the whole height of the Wall as is E F. Then to take the breadth of the house C, which is the midst of A B, and to draw it to the distance, and where it shall divide the Ray A, at the point G, to raise a Perpendicule; then you must from the point F draw to the point of sight X, and the section that shall be made of the Perpendicule H, shall be the point of the Pinacle, to which you must draw from the corners of the house E I, if one would have there any advancings, he may set them there at his pleasure as we may see on the other side K.

For the sloping we must only prolong the line where one would set the top of the Roof, as is here the line L M, and to give it such a bending as we would. To this, there is as much of the height M N, as the house hath of breadth N O, if from the points M O, we draw to the point of sight X, we shall divide the Perpendicule of the Hollow at the point P Q. which we must joyn with a right line, which shall finish the framing of the Roof. The figures of the other side make the house covered to be seen after these fashions.

The figures above are only to make it seen, that we must always keep the same order, although the Horizons change.

I have set a Church within the floor, which is covered with Pinacles, and the wings of the two bendings, which have only the simple draught.

There is also a Pavillion seen by one end, of which we have spoken in the figure preceeding.

Slate
Flat Tile
Thatch
Pan Tile

Eeiij.
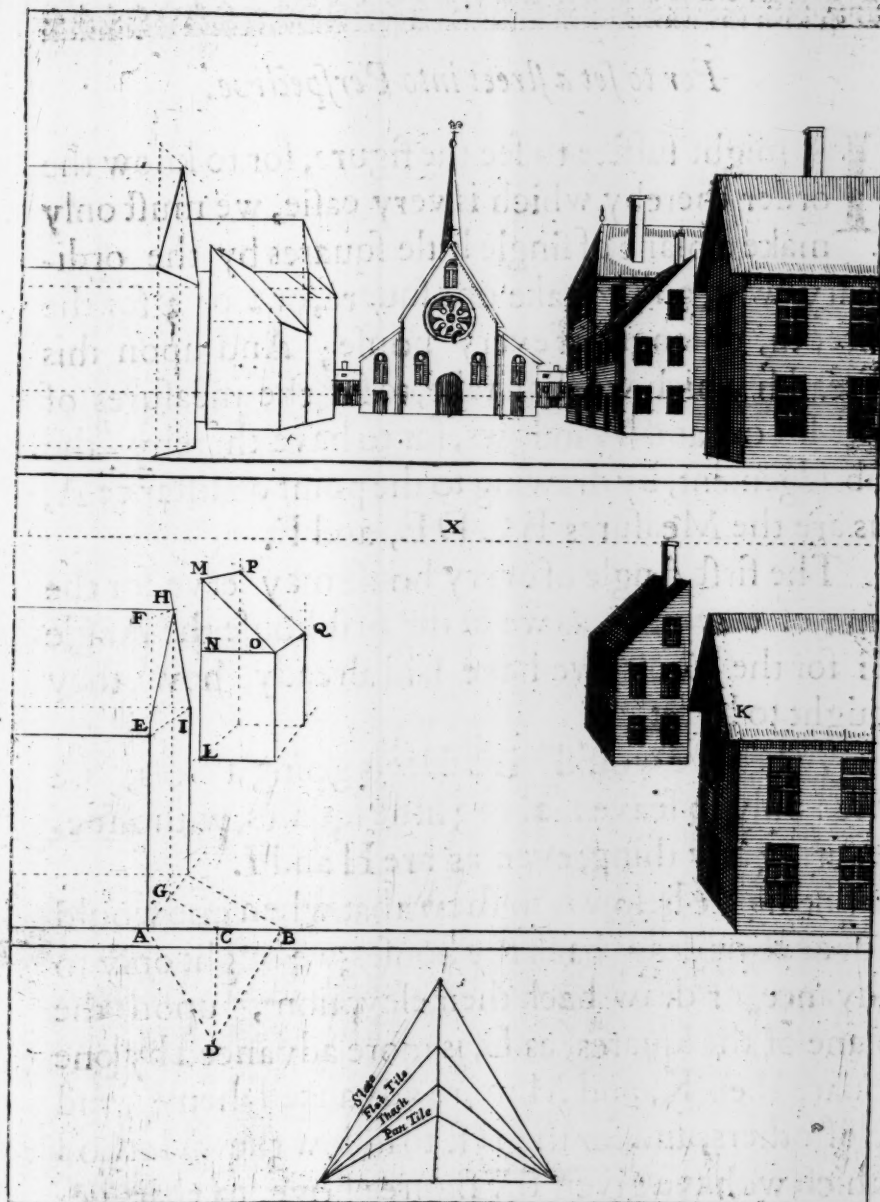
For to set a street into Perspective.

IF might suffice to see the figure, for to know the
order thereby which is very easie, we must only
make a plane of single little squares by the ordi-
nary way, and to take one square, or 2 or 3 for the
bredth, or length of every house; And upon this
breadth which we shall take, to set the measures of
the Doors and Windows, for to have thereby the
abridgement, by drawing to the point of distance A,
as are the Measures B C D E, and F.

The first Angle of every house may serve for the
line of elevation, as we at the first house the Angle
G for the Roofs; we have said already, how they
ought to be set.

When we would have streets going a cross, we
need only to leave 1. 2. or 3 little squares, without e-
levating any thing, even as are H and I.

The figure below is to shew that when one would
advance, or draw back the houses; we ought only to
advance, or draw back their elevation, upon the
plane of the squares, as L, is more advanced by one
square then K, and M more advanced then L, and
so of others, and for the rest to follow the Method
which we have given the figure above, to that be-
low.

❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀❀
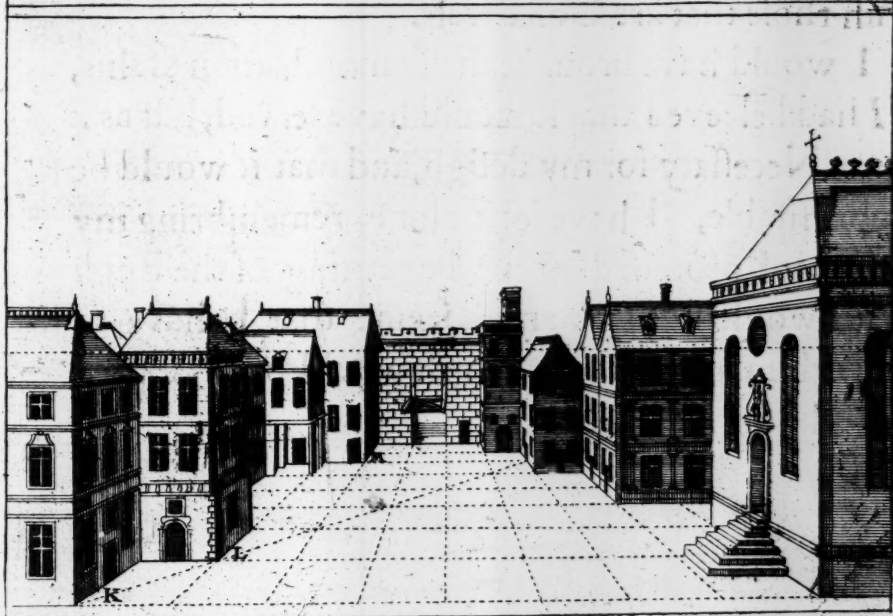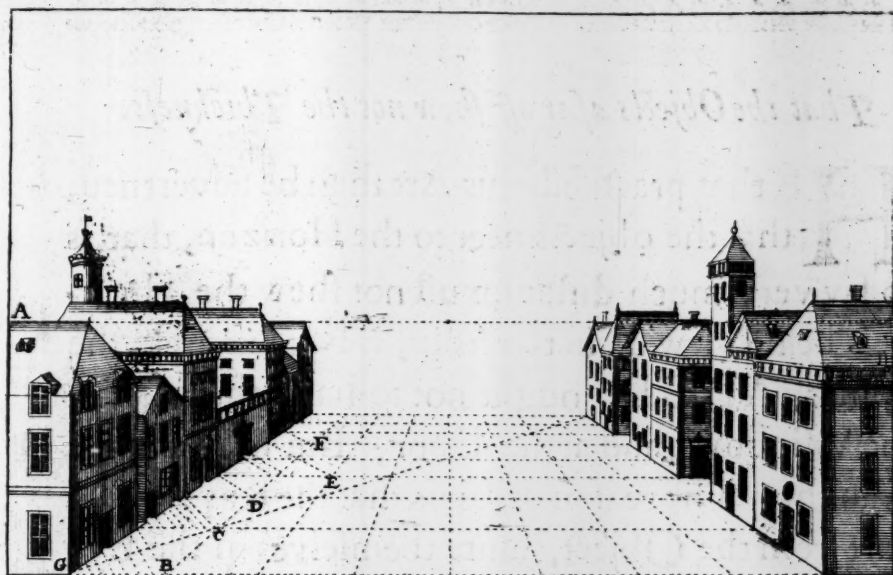
That the Objects afar off shew not the Thickness.

HE that practiseth this Art shall be advertised, that the objects neer to the Horizon, that is to say very much distant, must not shew the Thickness being view'd in the front, For example, the houses, A B C D, ought not to have thickness at the Windows, and at the Door; But only a single draught : The reason of this is that the Rays which part from the Object, unite themselves in the Eye with those that are Collaterals.

I would have brought the demonstration of this, if I had beleeved that it would have served, but as it is not Necessary for my design, and that it would be unprofitable, I have let it alone, remembring my self, that I promised at the beginning of the Book that I would not give any, seeing that I have to do with many persons, which would be in trouble to understandthem.
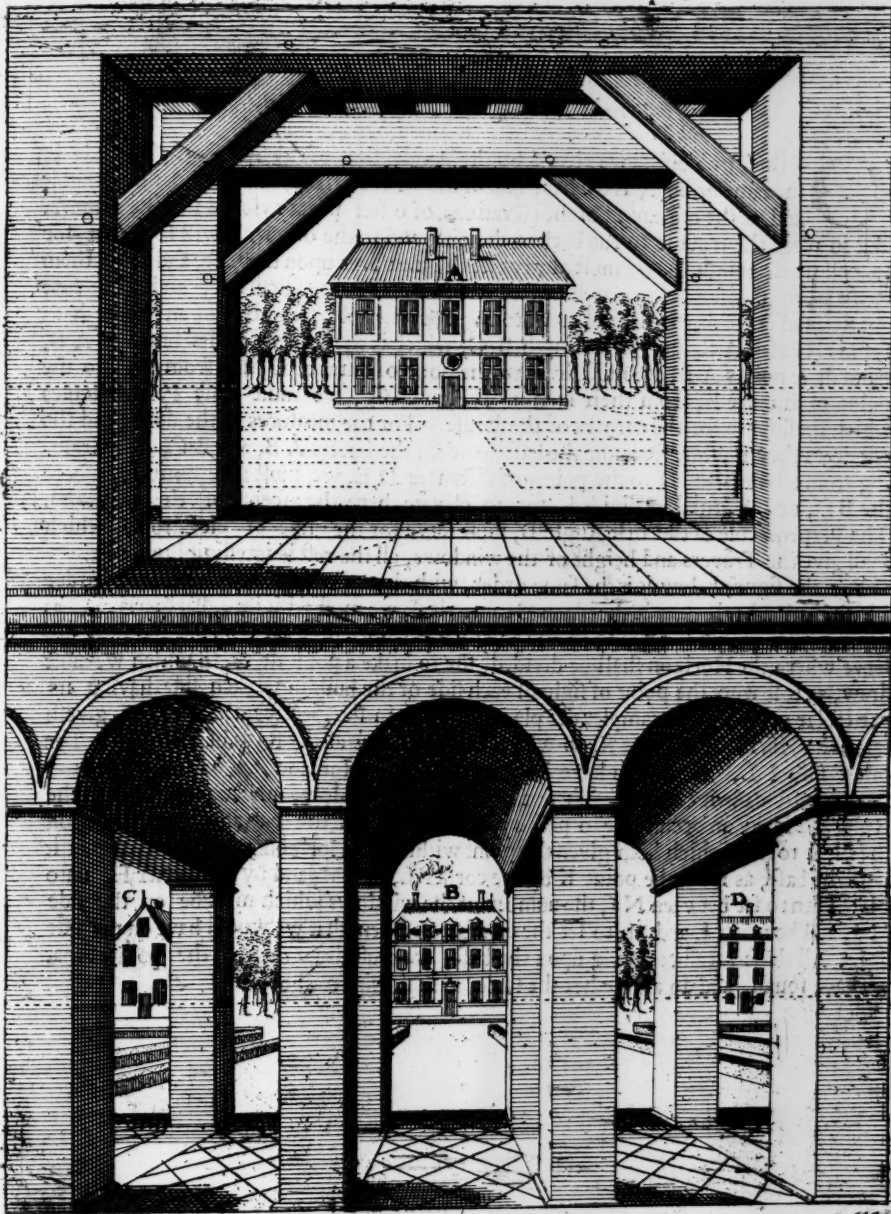
For the Buildings viewed by the Angle.

OF thefe two buildings view'd by the Angle, that of the firft figure is made in the fame manner, as we have faid of the little fquares, view'd by the Angle, and at the beginning of the elevations of other pieces view'd in like manner. But to avoid the trouble to run back to the one, and to the other : I will fay, that for to make thefe buildings, we muft always fet the meafures upon the bafe, and draw them to the point of diftance; and at their fections to raife Perpendiculars , and the firft Angle fhall ferve for the line of elevation : For example, this body of an houfe hath for his breadth A B, and for its length B C, which is the double of its breadth A B, from thefe points A B, we muft draw to the point of diftance D, and from B C, to the point of diftance E, from their fections B F, and G , we muft raife Perpendicules which fhall ferve for the corners of the houfe. For the meafures of the doors and the windows they muft be fet upon the bafe between the letters A B, and B C, and drawing from all thefe points to the points of diftances D E, we muft take notice , where the B D, or B E, fhall be divided, for to elevate there the afcents of the windows. The Perpendicule of the firft Angle B, muft ferve for the line of elevation, which fhall give the Travers and height of the windows, all the reft is intelligible enough.

For the figure below it is the fame order, with that of the Chairs without order which is, that having made the plane Geometrical, we muft fet it into Perfpective , as the irregular pieces Then to fet the Rule at every bending of the plane, and to ob-ferve where the Horizon fhall be divided, for to make a point there, to which we muft draw, as if it were the point of fight of each fide of the building, each fide having its particular point : For example, the plane being fet in Perfpective, the fide H I, giveth upon the Horizon the point K, to which we muft draw all the Rays of this fide : The other fide I L, muft alfo have its point within the Horizon, but our paper is too fhort for to make it be feen. Thefe 2 points being found, we muft place there the Rule, and make an occult line to pafs by the other fide of the building parallel upon the plane to that which heth given the point within the Horizon ; and to continue it unto the bafe, as from the point K by the corner L, unto M; and by the corner H, unto N: Then to fet between N I, the number of the windows which muft be on the fide H I, and between I, and M, to fet the meafures of them that we would have on the fide I L : All thefe meafures being upon the bafe, we muft draw them to the points that we have found, and do altogether the fame, as in the figure above.

E D

F G

A B C

K

H L

N I M
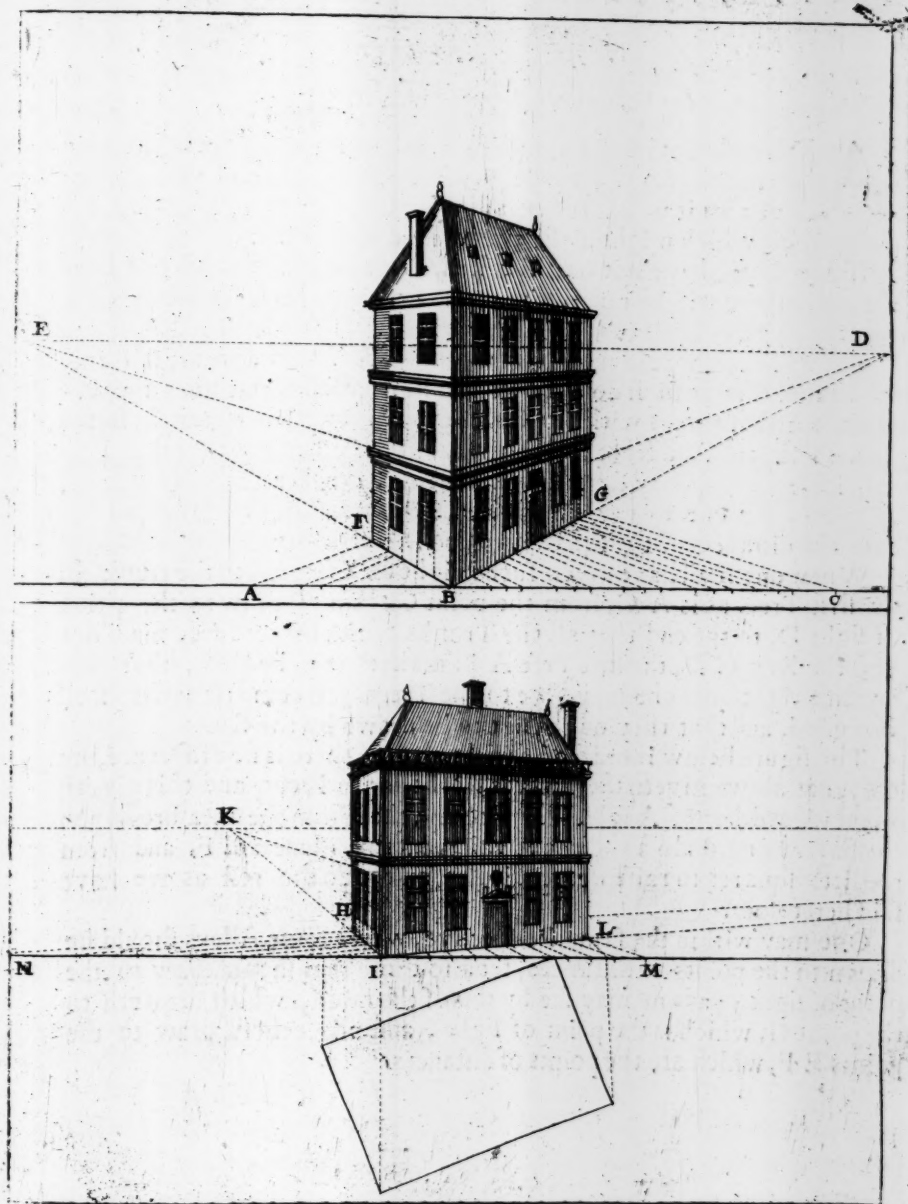
For to set Alleys of Trees in Perspective.

ALthough that by the orders fore-going one might draw sufficient instructions for to set Alleys of Trees in Perspective, yet I did believe that it would not be unprofitable, to give a particular order therein, which might make the method more easie.

If one would have but one Rank of Trees on each side of the Perspective, there will be no need to make a plane of little squares, he may only do, as I have said in the fourth advice Fol. 17.

But when one would make a company of Alleys to appear, it seemeth to me, that he sh ll do very well to frame with occult lines a pavement of little squares with the Oaks, even as it hath been taught in the planes Fol. 31. And from the Diagonal of little squares to raise Perpendicules, as one may see A B; If one desire the Trees to be farther of, or nearer the one to the other, he must encrease or diminish upon the base the distances of the squares.

When one shall have given such height as he would to the trunk of the first Tree, as is A C, from the point C, he must draw to the point of sight D, to the end that all the Trunks of the other Trees may not pass the Ray C D, the first Tree A B, maketh it to be seen, that between 2 right lines one may give to the Trees such compass as he shall find good, and that they ought not to be drawn by the Rule.

The figure below is ordered as that above, there is no difference, but only that above giveth the squares Right, or in Front, and this giveth them view'd by the Angle, that is to say, that from the measures upon the base we must always draw to the points of distances E F, and from the little squares to raise Perpendicules, and to do the rest as we have said heretofore.

One may within the same Perspective, where some Alleys should be drawn to the points of distances, set also those that should draw to the point of sight; as one may see by this of the midst, which draweth to the point G, which is the point of sight, and the others draw to the points E F, which are the points of distances.
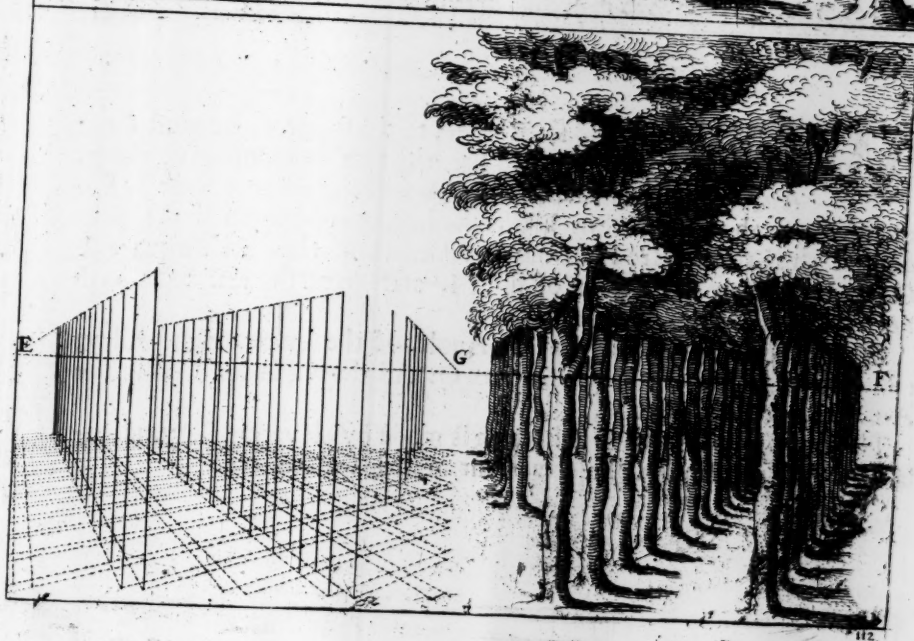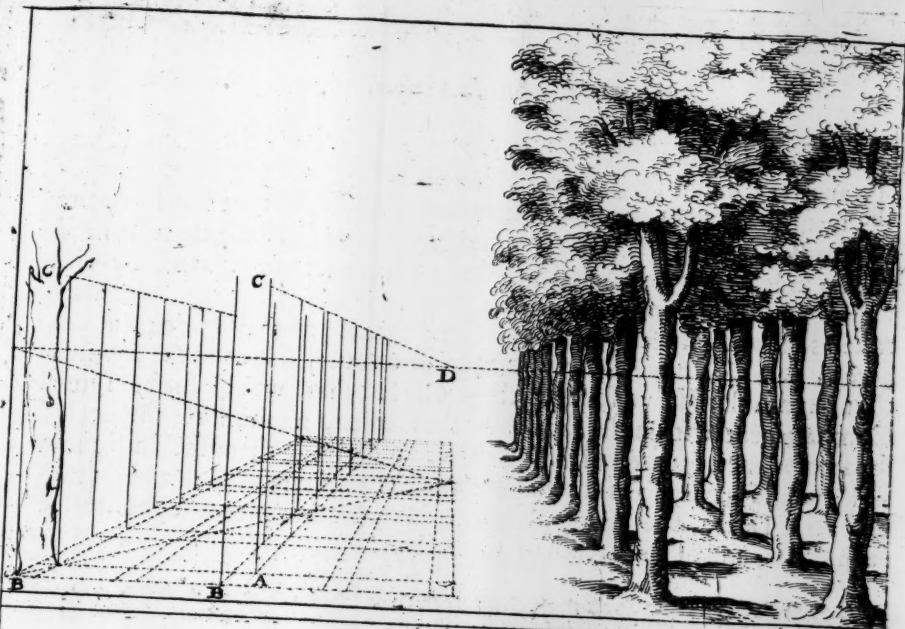
Ffiij.

For Gardens in Perspective.

I Have given in the Treatise of Planes, the Method to abbreviate, and set into Perspective the Plane of a Garden with its Compartments, by an Order sufficiently easie; supposing that you have the Plane. But as I avoid these Geometrical Planes, because there is need of too much time for to make them, I have set these here, by the which we shall know, that having made a Plane of squares, we may take as much or little as we will for the squares of the Garden, as are here A B, which have each three squares on every side: and the squares that remain shall serve for the Alleys C. He that would make some Compartment within the squares of the Garden, he must use the little squares of each square, dividing them, and giving them such a figure as he would have, so as we may see the little square A B: and on the other side D E: the hedge-Rows and Arbors are placed opposite to each other, and of the bredth of the Alleys.

The little Squares with Borders.

WHEN one would set Borders to the squares, he must set at the corner the heights and bredths that he would give them. And from these Measures to draw to the point of sight I. For example, in the figure below F G is the height and bredth of the Borders of the little square H, from the corners of this little square F G, we must draw to the point of sight I, and do all the rest as it hath been said several times.

For the Arbors, we must from the Angles of the squares of the Alley, elevate the Ascents or Perpendiculars O. All the rest is done, as in the Arches view'd by the side, fol. 60.

The little wood which is at bottom is made by elevating Perpendiculars from all the Angles of a Pavement of little squares, &c.
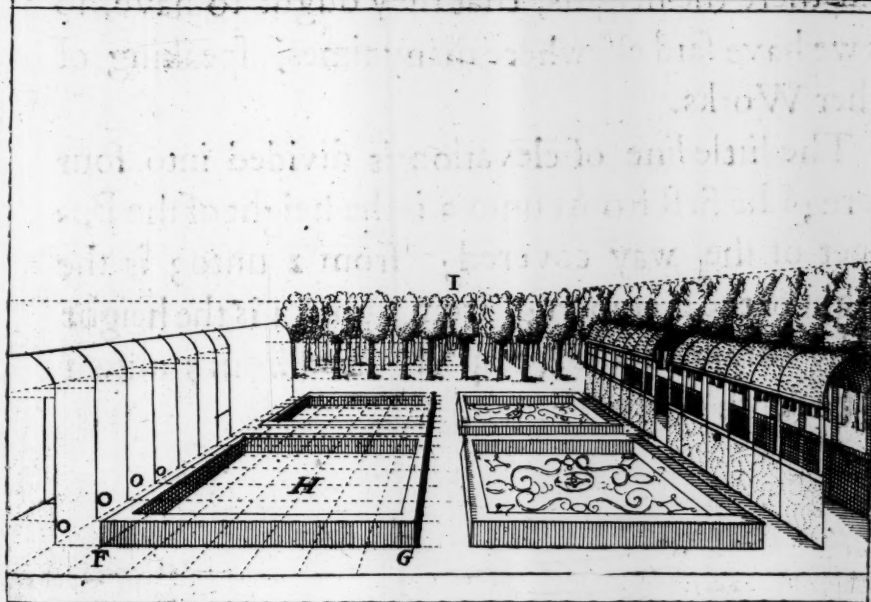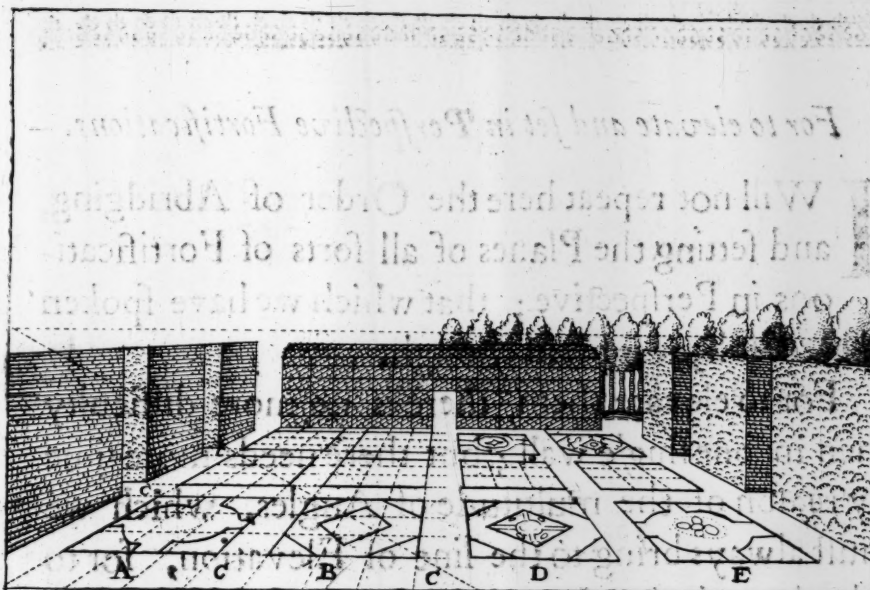
For to elevate and set in Perspective Fortifications.

I Will not repeat here the Order of Abridging, and setting the Planes of all sorts of Fortifications in Perspective; that which we have spoken thereof fol. 39. is plain enough.

For to elevate them, there is no more difficulty then in one single wall; but there needs more time by reason of the multitude of Angles, which we must always bring to the line of Elevation, for to take there the heights, that they ought to have, so as we have said elsewhere many times, speaking of other Works.

The little line of elevation is divided into four Parts; The first from 1 unto 2 is the height of the Parapet of the way covered; from 2 unto 3 is the height of the Rampart; from 3 unto 4 is the height of the Parapet of the Rampart. And from 5 unto 1 is the depth of the Trench.
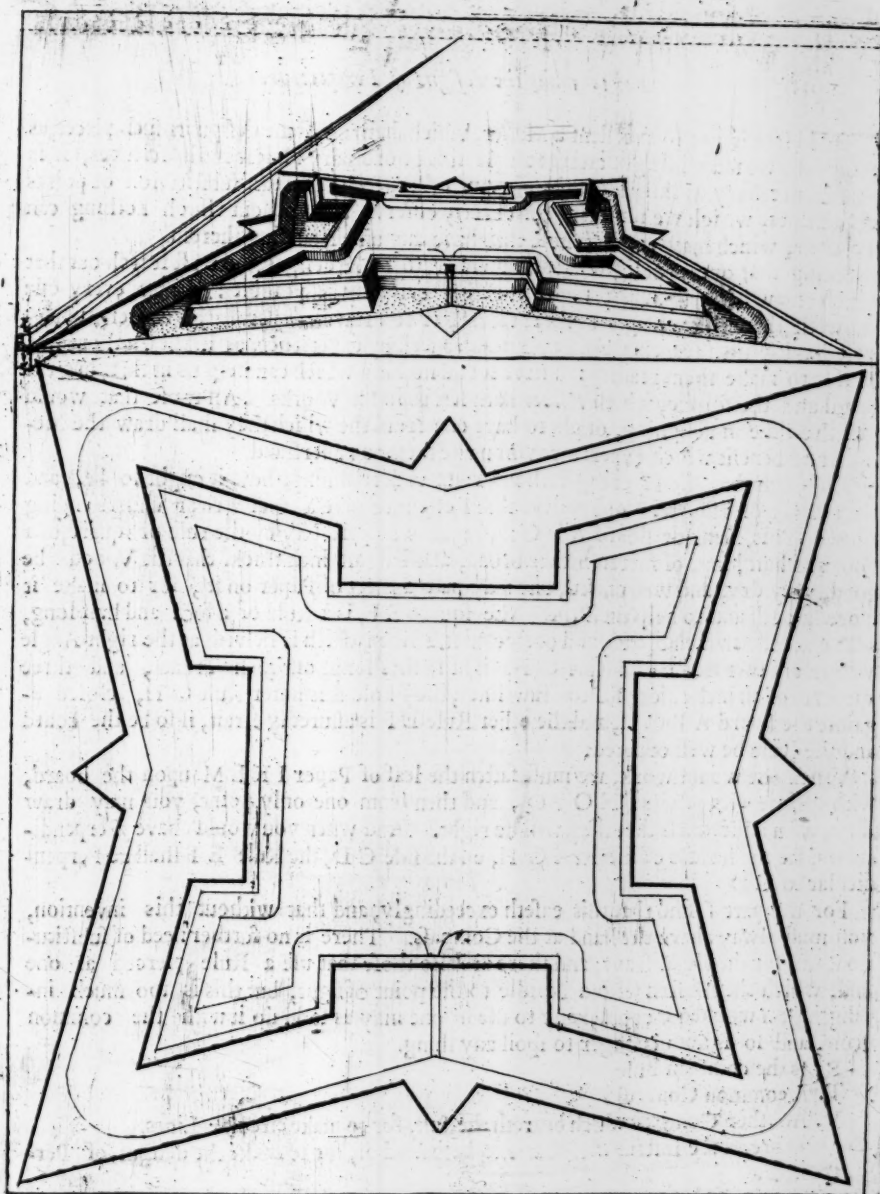
✻✻✻✻✻✻✻✻✻✻✻✻✻✻✻✻✻✻✻✻✻✻✻✻✻✻✻✻✻✻

For to make the defigns of Perfpective.

THere is not fo excellent a Mafter, which hath not fome defign in fuch pieces, as he would willingly attain to : If this be ordinary almoft in all fciences, it is neceffary in this, more then in any other, by the great fubftitution of points and of lines, which we muft therein exactly obferve, and without which nothing can be done, which may content thofe that have any underftanding therein.

Seeing that one is obliged in fome manner, to make defigns, we muft fearch out that which may help to make them exactly, that may be poffible : and as every one knoweth that all the length of thefe works, is to draw lines parallel, and Perpendiculars, having then fearched the Invention, as well by experience, as in the Authours, to be able to make them readily : I have found nothing which can help us in that, but the board and the fquare, which *Viator* hath left us in his Works. All thofe that would pafs the time in defigning, ought to have one from the which they fhall draw the delight and benefit which experience will make them to underftand.

Although that the Figure giveth fufficient underftanding, how it ought to be, and the manner of ufing it, I did believe that I ought to give a more clear underftanding thereof. This Plank or Board A B C D, ought to be perfectly by the rule or fquare, of a Foot and half long, of fifteen inches broad, and half an inch thick, that the Wood be good, very dry, and well united, one may paft a fheet of Paper on it, for to make it more fmooth and to help the Pen. The fquare E F, is a Rule of a foot and half long, as the board, an inch broad, and of thicknefs 2 lines, which is helved at the right Angle within another frame of a Rule G H, eight inches long, one inch broad, and three quarters of an inch thick, for to draw lines, they hold this latter Rule G H, clofed againft the board A B C D, and the other Rule E F is affuredly ftrait, if fo be the board and the Rule be well ordered.

When one would work, we muft faften the leaf of Paper I K L M upon the board, with 4 little bits of Wax N O P Q, and then from one only point, you may draw lines, with affurednefs that they will be right. And when you would have Perpendiculars, fet the handle of the Rule G H, on the fide C D, the Rule E F fhall be Perpendicular to C D.

For my part I find that this eafeth exceedingly, and that without this invention, you muft always have the hand at the Compafs. There is no further need of fubftitution, but for the vifual Rays, and there are alfo thofe that ufe a Rule pierced at one end, which they faften with a Needle to the point of fight, but this is too much intangling, I would not counfel any to ufe it, one may as foon do it with the common Rule, and fo is not in danger to fpoil any thing.

R. Is the common Rule.

T. A common Compafs.

V. Another Compafs which beareth the Ink, for to make circular Lines.

See here are all the Inftruments that one hath need of, for to make the defigns of Perfpective.
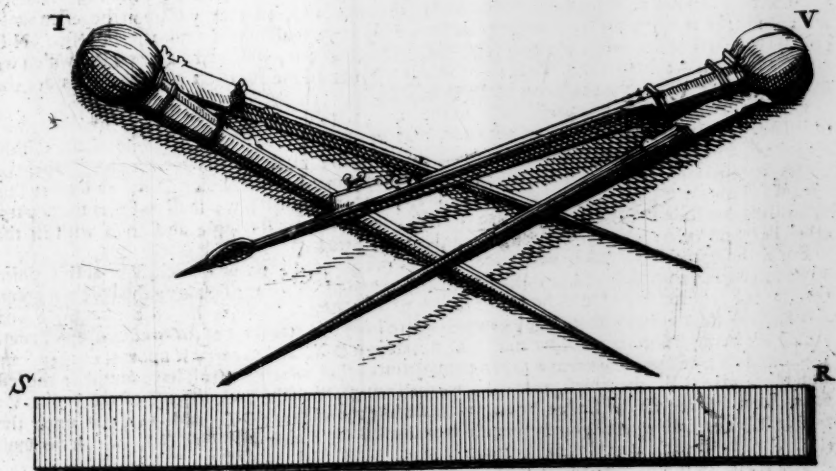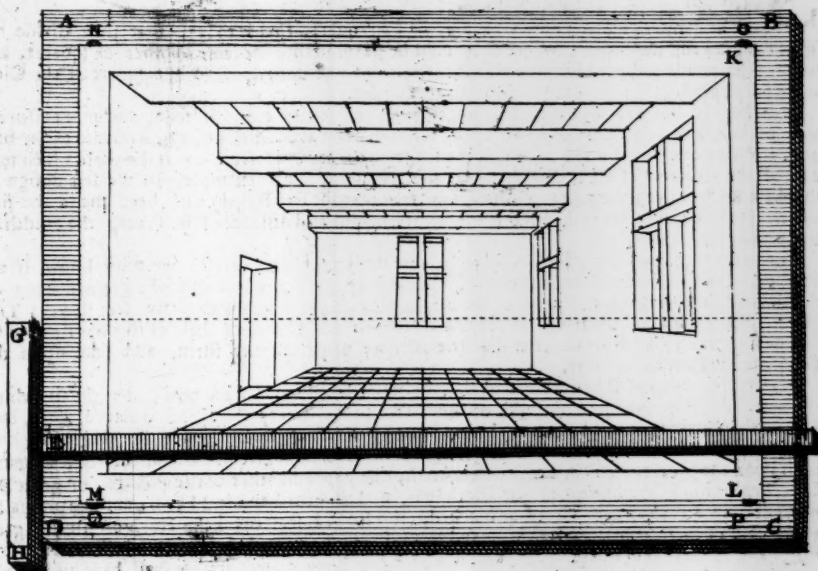
For to draw little Perspectives into great, and great into little.

Seeing that designs are made in small, with more facility then in great, it is credible that they will be made therein always, the which hath made me resolve to give the Method of setting small designs into great upon Cloth.

The Painters use ordinarily Squares or Checquers, that is to say, that they divide the small designes and the clothes, where they must be painted into the same number of squares, and set proportionally; that which is within one square of the design, into the square of the Cloth which answereth to it; some do like well of this Order.

But here is another, which in my judgement, is more easie, more facile, and more assured; we must have a skale proportionate to the less design, and another skale proportionate to the bigger. When one would make a design, the first thing that he resolveth on, is the skale which must give all the Measures of all the other pieces of the design. For example, in the less design A, the skale B C, of five little parts, (which one may take for feet Royal) hath been made the first upon this skale; they have taken the Horizon, the height and distance of the Trees, the bredth of the Alleys, &c.

For to set this small into great, observe how we must proceed. First, we must know, if the Perspective must have the natural Horizon, that is to say, that the bottom of the Picture being on the Ground, the Horizontal line be at the height of our eye, which is about five feet Royal; This being, there must be five little parts which are between B C, to make a skale of five feet Royal F G, that having taken all the Measures at the little one, we may transport them, and take upon the great one, as I am about to say.

The two Measures of Proportion or skales, being ordered, as I have now said; the first thing that one doth, is to take upon the lesser design with a pair of Compasses; the distance of the base D unto the Horizon E, and to carry this opening of the Compass D E, upon the lesser skale B C, and to take notice what number of Parts it shall give, as he doth give 5, we must then take as many parts upon the great skale F G, and set them on the one part and other of the Picture, or great Design, beginning at the bottom of the Cloth H H, and they shall end in I I, from these points I I we must draw a Packthread whited or blacked, this line I I shall mark the Horizon in the great Picture; Then to take the distance or sinking K L, of the lesser design, which is the foot of the House; and to carry it upon the lesser skale R C, for to see how many parts we shall have, and to take the same number upon the great skale F G, and to set that which we shall finde upon the edge of the Cloth H M, H M, which we must tringle about, as the Horizon for to have the sinking of the seccond Tree; In the less design, we must take the distance N O, and carry it upon the lesser skale B C, and take as many parts upon the great scale F G, as we shall have found in the less. N O giveth two parts of the lesser, we must take two of the great one, which will give H P, which we must tringle, as we have said: We shall use in like manner all the Parallels to the base, as are the other Trees, the Windows, the Roofs of the Houses, &c.

For the Plumb lines or Perpendiculars to the base, it is the same Method, there is nothing but to change the side for to mark them, which is, that in stead of marking on the side of the Cloth, as we have done, we must mark above and below. For example, for to have the two Cotners of the house at bottom; we must take with the Compasses upon the lesser design Q R, and carry this opening upon the scale B C, we shall finde about 7 parts and an half; we shall take as many parts upon the great scale F G, which shall give H S T S, which we must tringle and do so with all the other Perpendiculars, whether building Trees, Hedge-Rows, &c.

For to finde the visual Rays, which are the lines that go to the point of sight V: at this point V we must fasten a pack-thread or thread, with a pin bended, for fear of making the hole too great, this thread or pack-thread must be of the length of the Picture, for to be able to tringle and draw all the Rays very exactly; For example, for to have the two Rays of the bredth of the Trees, which are in the less design D X, we must take this design D X, and to carry it upon the lesser scale B C, and to take upon the great F G, in proportion to that which we shall have found in the less which will give H Y, the which points H Y we shall tringle with the Pack-thread of the point V; for to have also the Ray of Hedge-Rows, we must take the distance D Z, and carry it upon the scale B C, and take as many parts upon the great scale F G, which will give H I, which we must tringle with the pack-thread from the point V, &c.

All that is in Perspectives falleth ordinarily under these three sorts of lines, Parallels, Perpendiculars, and Rays visual, which having been made easie to make upon the cloth, we shall less fear the pains of setting the less designs into great; for to set the designs of great into small, we must only change the Orders, that is to say, that we must take the measures first upon the great scale, and diminish them proportionally upon the less, as if the Horizon of the great design were of 5 parts of the great scale. I would take 5 parts of the lesser scale, for the height of the Horizon of the less design, and so of all the rest.
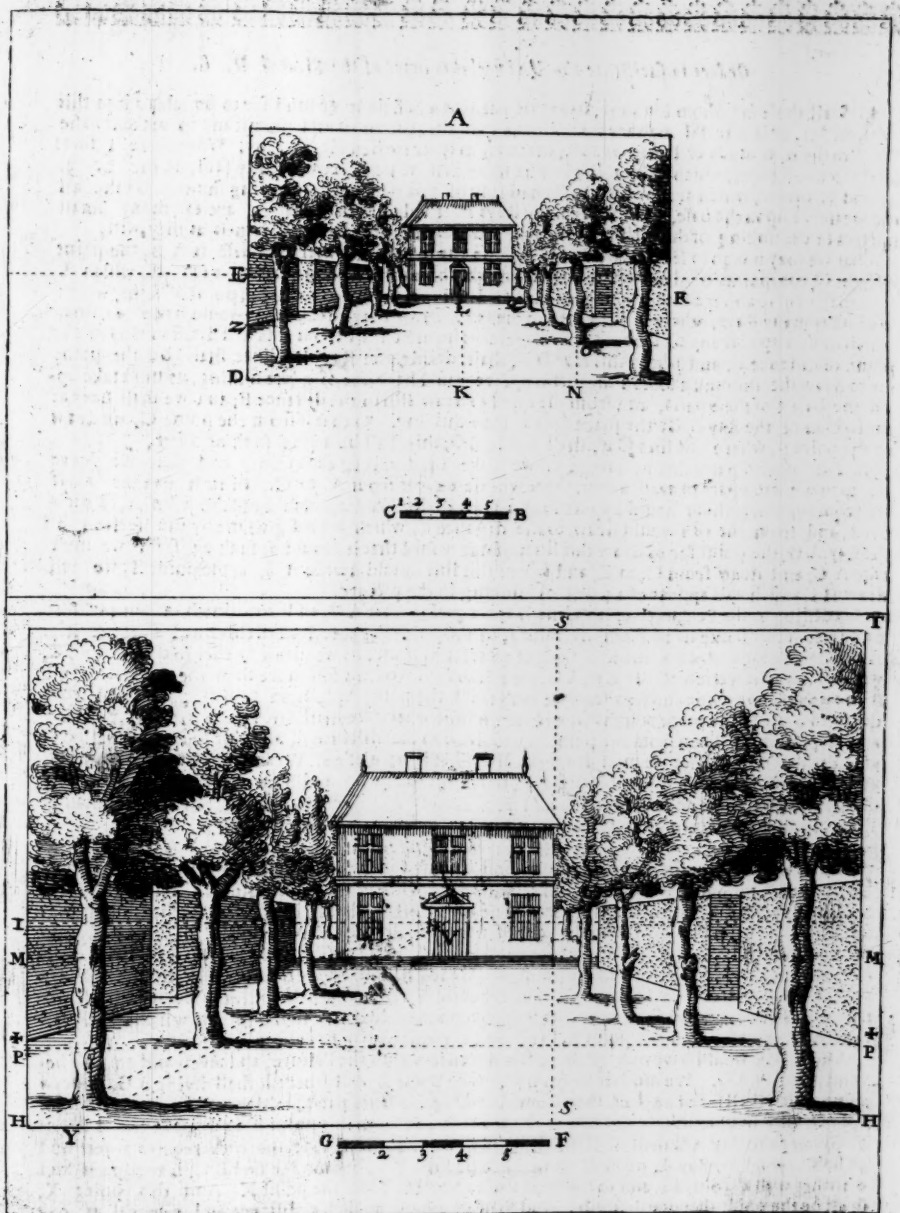
Orders to facilitate the Universal manner of the Sieur G. D. L.

AS all those for whom I labour, have not perhaps a sufficient ground for to be clear into this order, or Universal manner; I believed that the Author would permit me to make it easie to them, as much as I shall be able, that they may draw benefit thereby. Wherefore I shall set these two figures, which will cause to remember that which I have already said, in the 2. 3. 4. and 5. advice, which are for the understanding of this order, there having shewed to take all the measures upon the base, and that as many Rays as divide the Diagonal C, are as many small squares in the sinking of the picture, to which squares they give such a greatness as they will.

That we may not go to seek so far, let us look on the first figure where the base is A B, the point of sight G, the points of distances B F, I divide this base into 12 equal parts; each of which I shall make to be about a foot, and from all these divisions, I shall draw to the point of sight, which shall be as many Rays, whereof A and B are the last. Now I say that he that would have a line, which should appear sunk a foot in the Picture, that he must draw from the first division B D to the point of distance F, and where this line D F, shall divide the Ray B G, that shall be the point for to draw the line sunk a foot in the picture, if we would have one of 3 feet sinking, we must take upon the base 3 of these parts, and from the third to draw also to the distance F; and we shall have at the section of the Ray B G; the place for to draw this line. So that if from the point C, we draw to the point F, where this line C F, shall divide B G, this shall be a line sunk of 6 feet.

If of the other 6 parts that remain A C, we make 24, dividing each into 4, and that we leave not to make each part to avail a foot, there will be 24 feet from A, to C. In such manner as if we require a line, which should appear sunk 18 feet in the Picture, I should reckon from A, 18 little parts, and from the 18 I would draw to the distance F, which would give me by the section of the Ray A G, the point for to draw this line; if one would that it should be sunk 24 feet, we must take A C, and draw from C, to F, and where this line should divide A G, at the point H, we shall draw H I, which will appear of 24 feet of sinking in the picture.

According to the Perspective, this line H I, is equal to that A G, and containeth as many feet or parts, so that if one draw from the point I, to the point E, the section of this line I E, at the Ray A G, shall be for to draw a line K L sunk of 48 feet; if from this we draw further to the distance E, we shall have the section of the Ray A G, yet a line removed 24 feet more then the others. And if one would have a line sunk 30 feet, we must from the point A, reckon 6 small parts, and from the sixth draw to the point of sight G, and take notice where we shall divide the line H I, as here at the point M. Then from the point M, to draw to the distance B, and this line M E, shall divide the Ray A G, where we must draw this line N, if it were of 40. We should from A, reckon 16, and do all the same if, it were 60, we should from A, reckon 12, and from 12, draw to the point of sight G, unto the line K L, which should be the point O, Then from O, to draw to the distance E, and from the section of the Ray A G, shall be for to draw this line.

For the second figure.

BY that which I have spoken, it is easie to find a point for such a sinking as one would have. There remaineth to shew how we may find it within, or without the Ray A G, or B C, for this the line B C, shall serve as a scale of six feet, the one of which I shall divide into twelve inches, that I may there find the half, the third, and the 4th of a foot. All being thus ordered. If one require of me a point which appeareth of 17 feet long, and of a foot and half within the Ray A G. I will draw from the 17 part of the base to the point of distance B, and where the Ray A G, shall be divided in P, I will draw a line P Q, now when one requireth a foot and half within the Ray A G, I will take with a Compass upon the same line P Q, but on the side B C, a foot 6 inches, which I will carry from P, unto R. And this point R, shall be the point which hath been demanded.

And if one would have one yet at 29 feet distance within the Picture, and seven and an half beyond the Ray A G. We must draw from C, to the point E, and where it shall divide A G, to draw a line which shall be of 24 feet, then from A, taking five little parts, to draw them to the point of sight G, until that we divide this line at the point S, and from this point S, to draw to the distance E, Where the Ray A G shall be divided, we must draw a line T V, seeing they require 7 feet and an half beyond the Ray A, we must upon the same line T V, but on the side B C, take 7 parts and 6 inches with a Compass, and carry them from the point T, to the point X. And this point X, shall be the point that one desireth, And so of all others, at such a distance and removal, as one would have.

Of a general manner for to exercise Perspective, without setting the Point of distance out of the Picture, or Field of the Work by the Sieur G D L.

THIS Order obligeth us to make a Geometrical Plane, or at least a device of Measures, as well for the Plane, as for the Elevation; that by the one, or by the other, it may be brought to set into Perspective. I will take for the object or subject the same Example of the Author, which is a Cage squared, covered with a Point; or a Building covered like a Pavillion or Tent, to the which we shall give the Measures by the means of a Scale.

Having then made the plane of this Cage, *m, i, l, k,* which I have set on the top of the figure, it must be, that at such a distance as one would have, that the Object seeme recoyld within the Picture, as it is here of 17 feet; we make a line *a b,* which shall be the base or the bottom of the Picture, which we shall place according to the aspect, that the object ought to be seen. Then from the two ends of this line *a, b,* we must draw two lines Parallels the one to the other, and undeterminate; thrt is to say, it is no matter if they divide the plane, nor in what place, as are *a g, b g,* upon the one of these lines, as here this *a g,* we must make little Parallels to the line *a b,* which may go unto the Angles of the plane, and by the means of the scale, to see how far each Angle of the plane shall be removed from this line *a g.* the which shall be marked near to each line. Now from the place, which one shall choose for to view the Picture, which is here the point *c,* at five feet near to *b* We must make a Perpendicular to *a b,* which shall be the line *c t,* to this line *c, t,* we must give as many little parts of the scale as we would have removed sor to view the Picture, which is for this 24 feet, and at the end of these 24 feet, which is the point *t,* to raise a small Perpendicule of the height of the eye, which shall be the line *c t,* of sour feet and an half.

The Cloth, the Wall, or the Paper, being ordered for to set the plane in perspective, and upon the planet make the Elevation; We must divide the bottom of the picture, or the base A B, into as many parts as that *a b* the plane; this having 12 thereof. We must divide the great A B into 12, which will be of value each a foot. Above the points A B we must set the height of the line *s, t,* which is of sour feet and an half. Take them with the Compasses sour parts and an half of those which are upon the line A B, and carry them perpendicularly upon the points A B, which shall give the points E F. and draw the line E F parallel to A B, and this line shall be the Horizon. Seeing that in the plane the point C, which is the place for to view the Picture, is removed five parts from *b,* we must reckon as many parts from B, and from the fifth C, Elevate a Perpendicule to A B, which shall divide the Horizon at the point G, which shall be the point of sight, to which we must draw the Rays A G, B G, which shall represent the Parallels of the plane *a g, b g,* for the point of distance, it shall be the point F, and by reason that the line *c, t,* hath 24 feet, must take six parts of the line A B, which shall be A D, and divide them each into 4, and these 24 parts shall serve for a scale, for the depths, or removalls; being sufficient for to let them out infinitely. And the six parts that remaine between B D, shall be the Scale which shall furnish the Measures of the set according as the lines drawn from the points found by the plane, shall divide the Rays drawn to the point of sight G; For as this Scale, is a pyramide, whereof B D, is the Base the Measures diminish in proportion as they are suak. have divided the one of these parts into Inches for to finde there all the Measures, as they are upon the plane.

With the Scale or Removalls we finde the points of the plane, and with that of the Measures the length that lines ought to have, as well for the plane, as for the Elevation.

How for to finde the plane in Perspective, we must observe all the Measures of the Geometrical plane the first Angle of the plane *r, m,* is removed 7 feet from the point *a,* upon the line *a, g;* Wherefore I will reckon 17 parts begining at A; and from the seventeenth, I will to the point F, dividing the Ray A G, at the point R. from this point R, we must draw a parallel to the Base; and by reason that the Plane *m,* is within the Ray *a g, a* foot and an half, we must upon the same line R but on the side B D, take part and an half for to carry it within the Ray A G, which shall be the point M, representing the Angle of the plane M; for the Angle *l;* which is removed 26 feet from the point *a.* we must from the point D, which is 24 feet from the point A, draw to F, and where the Ray A G, shall be divided at the point y, draw a Parallel. Now as it is about to feet, that this line y, is enough removed; we must draw from the second part of the Scale to the point G, and where this Ray shall divide the Parallel y. at the point Q, we must draw Q F, which shall give upon A G, the point H, from which point H, we must draw a parallel to A B, and upon the same line H, but on the side B take the Measures for to give 13 feet and an half from the point H unto the point L.

For the point *k,* which is removed 29 feet from A, we must from the fifth part of the Scale A D, draw to the point G, and where this Ray shall divide the Parallel y, at the point O, to draw O F, for to have upon A G, the point N. Then from the point N, to draw a Parallel for to take on the side B D, 7 feet and an half, which we must Carry out of the Ray A G, that is to say, from N to K.

For the point *i.* removed 38 feet from the point *a,* we must upon the Scale A D, take 14 parts, and from the 14 draw a Ray to the point G, which shall divide the parallel the point S. And from the point S, to draw to F, which shall divide the Ray A G, at the point T, removed 38 feet from the point A: by reason the Parallel y is of 24; to the which having joyned 14. they make 38. at the point T. And by reason that the Angle *i.* is 4 feet and an half within the Ray A G, we must upon this Parallel T, but on the side D B, take feet and an half, and Carry them from the point T; to the point I.

For to frame the plane we must joyn by right lines, these 4 points M I, K I, and from their Angles raise perpendicules at M, ss, L, ff, K, sr, and I ss. The which shall have Each 19 feet, as is marked in the plane by the line X, and from the ends of these perpendiculars, to draw two Diagonals, ss sp, ff sr, which shall divide themselves in Z, and upon this point Z; to elevate a perpendicular Z Æ, of 13 feet and an half. Then to draw lines from all the four corners ss, ff, sp, and sr, to the point Æ, and the Cage shall be framed in perspective. If one would it descend within the ground one foot, we must adjoyn one foot under every point of the plane; and joyn it together with lines.

Scale of   24   Feet
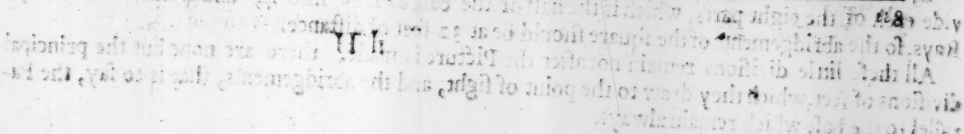
For to give justly the distance removed, the Point remaining in the Picture,

THose that would use this common manner must know, that the number of feet that we shall take upon the base, ought to have respect to the distance that they shall have determined of.

For to cause my Proposition to be understood, I will set in the first figure two distances, the one of six feet, the other of twelve, which have respect the one to the other, by reason that dividing into two each of the six parts, we shall have twelve.

Let us suppose then that the line A B is divided into twelve parts, and that from all these parts, one hath drawn Rays to the point of sight C, let us take now the half of these divisions A D, and draw to the point E, which is the distance of 6 feet; it is certain that the section of the Ray A C, shall be the abridgement of the squares view'd six feet distant. If from the point D we draw to the point F, which is the distance of twelve feet, this line D F dividing the Ray A C, shall give the abridgement of six little squares view'd twelve feet distance. He that would have the abridgement of twelve squares, view'd twelve feet distant, he must from the point B, which is the whole base, draw to the point F; and at the section of the Ray A C to the point H, shall be that which is required : or else from the point I to draw I F, which shall give the same point H, and the line H K shall be sunk twelve little squares viewed at 12 feet distance. We see in this that 12 little squares viewed at 12 feet distance, do meet in the same line H K, that six squares viewed at six feet distance, and all the lines of six squares, that the section of the Diagonal D G hath given, do reflect themselves by two and two to those, which the Diagonal D F hath given, the reason why the Diagonal D F hath given two lines for one of those D G, is that the distance is doubled. If it were trebled it would give three, and four if it were four-fold. Now for to finde on the side B D, the same sections, and the same number of little squares, as on the side D A, without the point of distance be out of the picture, we must only divide into two each of the six equal parts which are between B D, which will make 12 parts, and from their divisions to draw occult lines to the point of sight C; and if one draw Parallels to the base, by all the sections that the Diagonal maketh of all these Rays he shall have 12 squares of sinking in the same line, and if the distance were of twelve feet, although that G be but six feet of distance: the reason of this is, that by multiplying the Rays we multiply the squares, and multiplying the squares we remove the distance: see then how having made twelve parts of six , which were between B D, there ariseth twelve little squares, which make the same sinking that the distance at twelve feet distant. And he that would have the distance at 24 feet, he must divide still into two, each of the parts between B D, which would make 24 parts, and from the 24th. to the point D, to draw the line D G the section that it would make of the Ray B C at the point K, would be the sinking of the 24 feet.

In the second figure, I have set upon the line L M the same Measures as upon A B of the first figure, and on the side M N, the same sinking, and the same distance as on the side A D, which giveth the line H K, to the end that we may see, that he which would draw the fifth part, as Q G, or from the seventh as R G, that he should not have the true sinking which is at K: for R G would not sink enough, and Q G would sink too much, although from these 5 or 7 parts, there would be made twelve or twenty four.

Wherefore we must observe to take always a Number, which may be multiplied by the distance, as here the distance of six may serve for 12, 18, 24, 30, 36, 42, 48. and so an infinite number by six. The distance of 5 may serve for 10, 15, 20, 25, 30, &c. The distance of eight, may serve for 16, 24, 32, 40. 48, &c. We cannot fail doing thus, for supposing that the point of distance could not be nearer to the point of sight then G is near to C, it followeth that if G is at 6, at 7, 8, or at 10 feet from the point C, that the half of the base hath the same number, the which number we must divide proportionably to the removal, which we will give it. For example, if there be eight feet from N to L, and that I would have the distance of 32 feet without that G go out from his place, I will divide each of the eight parts, which is the half of the base as L N into 4, and 4 times 8 will be 32 Rays, so the abridgements of the square should be at 32 feet of distance.

All these little divisions remain not after the Picture is made, there are none but the principal divisions of feet, which they draw to the point of sight, and the abridgements, that is to say, the Parallel to the base which remain always.

Upper figure labels: G — C — E — F; K, H; B, D, A; numbers 12 11 10 9 8 7 6 5 4 3 2 1

Lower figure labels: G — C — E — F; K, H; L, Q, N, R, M

A very fine Invention, for to make naturally Perspectives without keeping the Rules.

HAving set down all the Rules, that we must keep for to make exactly Perspectives : I would set also this Invention, and the following, for to make thereby perfectly fair ones and very exact without being obliged for to use any one rule therefore

This shall serve for those that love Panting, and take the pleasure to use it ; without being willing to take the pains to open the Compass, nor to take the Rule for to draw a line; for in this order, we shall not need neither the one nor the other. And nevertheless we may make very fair Perspectives, either of Buildings, of Gardens, or Landskips. Before we proceed to the order, we must know, that the principal piece and necessary for this invention, is a great leafe of Glass very clear, enclosed in a frame of Wood well smooth'd and thin, which I have marked with A: at the bottom of the figure, this frame must slide between two pieces of Wood, an Inch and an half thick, the which must be fastned to the end of a board, which is of the breadth of the Frame, as B C sheweth, fit for to receive the Frame A. The breadth of this board B D, shall be of a foot C. At the midst of the fore-part of this board, we must make one or more square holes E, for to fasten there a little Iron Rod or Wire, as a Rule pierced all along, whereby to raise it, or let it down at the top of this Rule F, there shall be a Round of 3 or 4 Inches of Diameter, without thickness, as it might be of white Lattin, the which must have a little hole in the midst, a s it were for a piece to go through, all these things put into one, make the piece G

Although the figure sheweth the order, and how we must use this piece G, yet I will not cease to tell, how we must proceed therein. Having then placed this piece G, before that which one would draw, he shall look through the little hole of the spectacle F, if one can discover upon the Glass all that he would that should be there : if any thing come not there, you must put the spectacle nearer to the Glass; until that he do see there, that which he desireth The piece being so setled, we must mark upon the Glass, all that shall be seen there, looking through the hole F, which doth here, that which the point of sight doth in other Orders, it being most certain, that all that shall be marked upon the leaf of Glass, having the eye at the little hole of the spectacle shall be found perfectly in the Rules of the Perspective.

Every one knoweth how we must withdraw that which shall be designed; wherefore I shall leave that, for to say that one may mark upon the Glass with the Pen and Ink. and after that all is done, to moisten a little the other side of the Glass for to refresh the Ink and to set on the side, which we shall have traced, a Paper somewhat moist, and then to pass the hand upon it; and the Paper will take, all that which was marked upon the Glass.

If one will, they may also use a Pensil, and colours according as every one shall think good, it is enough that one know the invention to use it, for to retract that which they will : For it is as easie to retract a Pallace as a Countrey-House, or a Chamber, seeing that it is nothing but to set ones self in a place, where there may see that which they would design, and to bring the spectacle near the Glass, when there shall be need, by the means of holes, which are in the Board.

A Painter may also use this for to retract figures, at such a posture, as he shall have given them, for to retract after the embossing. In a word, for all that he shall judge, be assured, that the use will render many things easie that were hard before.

120
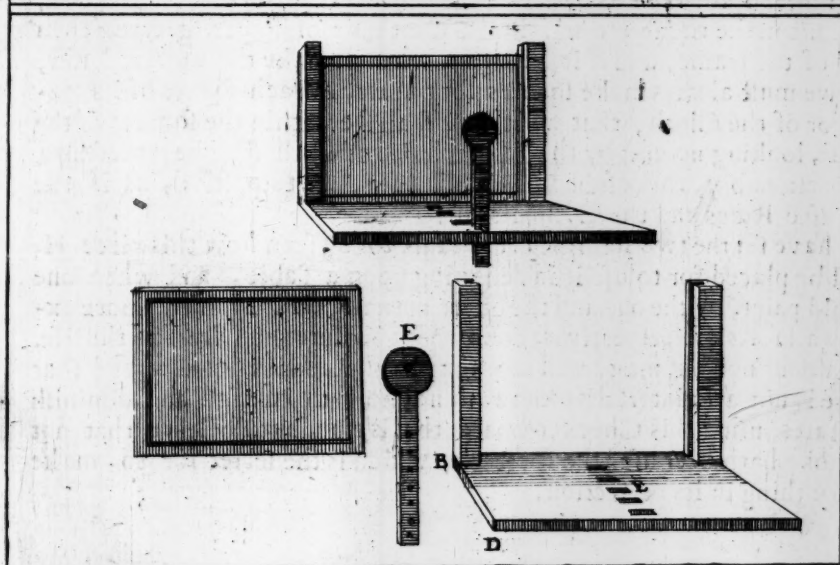
Another pretty Invention for to exercise the Perspective, without knowing it.

THis Invention is found to be as pretty, as the former, and some do esteem it more; by reason that the other obligeth to design twice: the first upon the Glass: the second to retract that which one hath done there : and in this, we design but once, and as exactly as the other.

I will not set down the framing of this instrument, it having no difference from that which I have now given, but only that instead of a leaf of Glass, we must set there a frame, divided by little squares, with threads very slender, as the figure sheweth it, the which I shall call a Lettice; for the number of the squares, I leave that to the discretion of every one, I shall say only that we must not make them too great , for to work more exactly, nor too little for fear of being confused.

For the order, there is need, that this piece H, be placed in such manner, that one may see by the hole of the spectacle I, all that we would design ; if the design, which we desire to make, must be greater then the frame, or then the Lettice is, or as others will, the Checker-board, we must make the squares of linnen-Cloth or of Paper, greater then that of the frame, and if it be lesser, we must make the squares lesser, but we must always make squares for to carry in each square of its paper, or of the Cloth , that which we shall see within the squares of the frame, looking upon it by the spectacle I, and if all shall be represented proportionab'y, the design will be as just for the Perspective , as if one had used Rules and the Compass.

I have set the two figures, for to cause to be seen how this piece H, must be placed for to use it in designing upon a Table , and when one would paint, by the one and the other manner, we may make more exactly all sorts of Perspectives, counterfeit Pictures, and draw to the life.

I doubt not but many will say, that this method is not new, and that there is not a Painter, that knoweth not how to enlarge and diminish Pictures, using this Checker-board, that is true, but I beleive that not any one hath ever used the spectacle, which is the secret for to make every thing in its perfection.
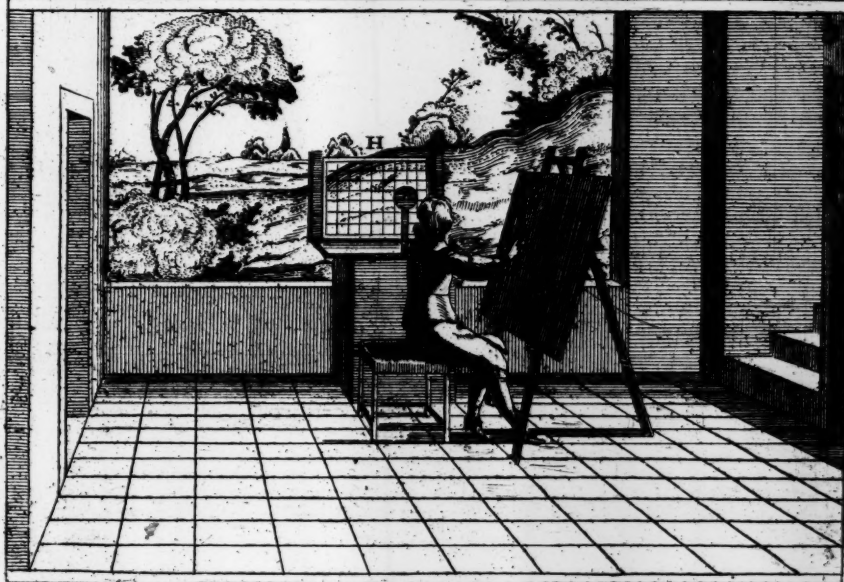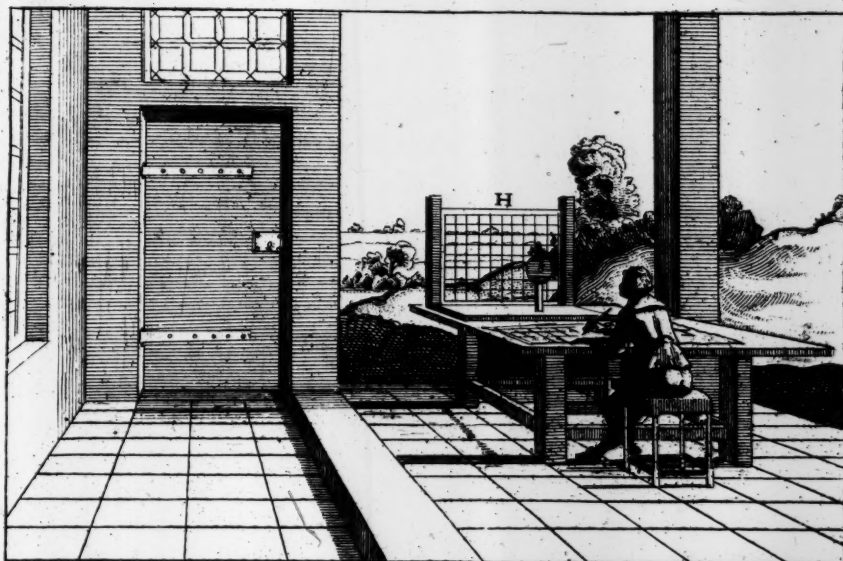
MEASURES
AND
PROPORTIONS
OF
FIGURES
IN
PERSPECTIVES, PICTURES,
AND
VVORKS EMBOSSED

PERSPECTIVE.

For Figures in Perspective.

After that we have set down that which may serve for to make all sorts of Perspectives, with the means to give them a pleasing and ornaments for to content the eye, there remaineth no more but to find out a way for to deceive it altogether, which is to set down the figures there.

But before we pass any further, we must make a distinction of figures; for it is another thing to represent a History, then to intend to deceive the eye in a peice, which sha'l be set at the bottom of a Gallery, of a Hall, or of an Alley in a Garden, for to these all figures of repose or resting are the best, and for a History, they must be all lively and spirited, by the diversity of their posture.

The multitude of Horizons, which the Painters take in their Pictures, is the cause that they make an infinite company of Faults there, by not knowing to give the height that they ought to the figures, proportionable to their Horizon, I will give them a Rule, that they may not fail there, whatsoever Horizon they shall have.

For the Figure having the Eye within the Horizon.

IN the Perspectives, which are set at the end of a Gallery, of an Alley, of an Hall, or of any other place for to deceive the sight, we must always set the Horizon at the natural height, that is to say, at 5 Feet Royal, which are the height of the common size.

He that would set there figures for to appear in the natural, they ought to have the eye within the Horizon: for if the Figures have the eyes within the Horizon as we have, they will appear to us of our height, this ought to suffice for the instruction, but for to be more clear, and to make my self better understood, I shall make use of these three figures instead of many others, which one may set there, if he will. The first Figure A, shall have the natural height, and the eyes within the Horizon, if I should yet have another Figure at the place B, I must from the point B, raise a line unto the Horizon, and that shall appear of the same height with the first. He that would have a third at C, let him always set the eyes thereof within the Horizon, it shall be of the height of the others within the appearance. In short, although there should be a thousand, there is no other Rule to be kept when the Horizon is at the natural height. I intend not to speak of Children, which ought to be made in proportion to the great figures, and according to the discretion of the Painters.

For the Figures having the Horizon below.

WHen Pictures are made for Halls, where ordinarily they hang them, and place them somwhat high, we must take the Horizon lower, for to approach to the eye, as far as shall be possible.

Now for to give justly, and with proportion, the height to each Figures, in what place soever, we meet with them, we must make one at what height we would, in some place of the picture, as is the figure D E, which is here that which we have cal'd the line of elevation in the preceeding orders.

For to find the height of other Figures, which one would set into this picture, which should appear as high as the first D E, we must from the Feet of this F, and from the top of its head D, draw lines where we will within the Horizon, as is the point E, and between this Triangle D E F, shall be found all the heights of the others: For example, if I would find the height that the Figure must have of the point G, from this point G, I draw a parallel to the base G H, untill that it divide the line F E, which shall be at the point H, from which I raise a Perpendicule, until that it divide the line, or Ray D E at the point I, and this Perpendicule H I is the height of the Figure, which we must take with a Compass for to carry it to the point G, if I would have another at the point K, I have only to make the same operations, and I shall have the Perpendicule M N, for its height, and so of as many as one will.

Horizon

A

C

B

Horizon   E

N

M

I

G

H

F

For the Figures having the Horizon high.

WHEN the Horizon is high, as one is sometimes obliged to set it, for it represents sometimes, which one hath viewed from an high eminent place, we must keep the same Rule with the Precedent, although it seem the contrary in that of the Horizon below : all the Figures are above the first, and go always by diminishing. And for this of the Horizon high, all the Figures raise themselves above the first, and the furthest distant is always the most elevated, but nevertheless the lesser in proportion, and according to the measure, which one shall take thus. Having made the first figure A B, we must from the top of its head, and from under its feet, draw in what place one would of the Horizon, which is here the point C ; all the heights of the other Figures must be taken between this Triangle A C B. For example, desirous to have the height of the Figure from the point D, from this point D we must make a Parallel to the base D E, unto the line A C, which shall be the point E, from which we must raise a Perpendicular unto the line B C, which shall give the point F this Perpendicular E F shall be the height which must be to the figure from the point D. If at the point G we would have yet a figure, you must make the same practise from the Point D, and you shall have the Perpendicule H I, which shall be for the height of the figure from the point G, And by the same Method all the other figures shall take the heights from whatsoever place it be.

For the figure that have feet at the Horizon.

IT is rarely that one maketh figures upon the Horizon, but if there were necessity, we must make those that one would make appeare the first, greater then the other, that is to say, to give them the Natural height, and all the others will be equal to them, and they shall be removed according as we shall make them the lesser. For example, the figure K L, is the greatest and the nearest and that M N, is the most removed : As the secret in this for the Painters, is to finish well those before more then those of the bottome, and the further they are removed, the more they are to be farit and less perfect.

The Rule of these Figures, and of those that have the Eyes within the Horizon, is no other then their owne height, for as well in the one fashion as in the other, there is but only to make the Figures lesser and lesse furnished, which we would have backward and seeme farther off.
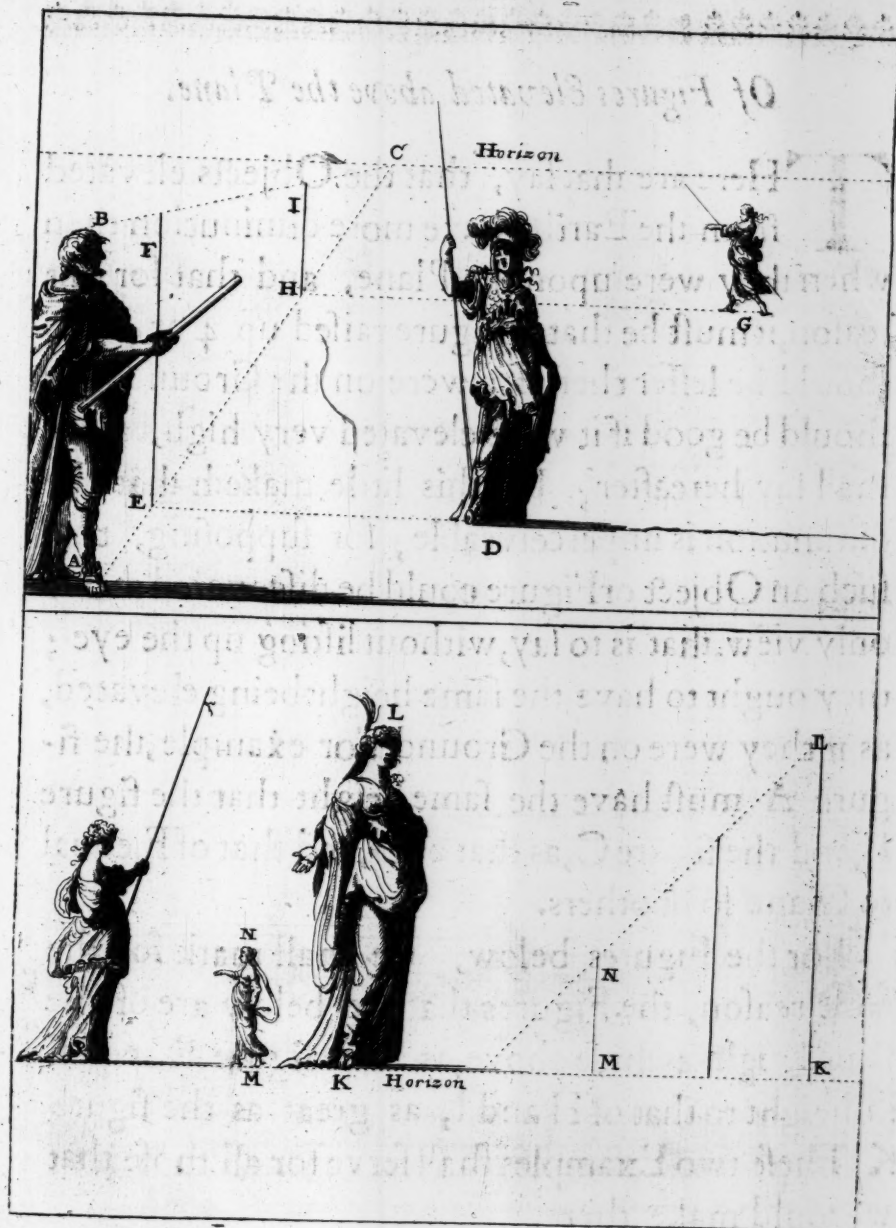
Of Figures Elevated above the Plane.

THere are that say, that the Objects elevated
from the Earth, have more diminution then
when they were upon the Plane, and that for this
reason, it must be that a Figure raised up 4 or 5 feet,
should be lesser then if it were on the Ground: this
should be good if it were elevated very high, as we
shall say hereafter; but this little maketh that the
diminution is unperceiveable; for supposing, that
such an Object or Figure could be discovered at one
only view. that is to say, without lifting up the eye;
they ought to have the same height being elevated,
as if they were on the Ground. For example, the fi-
gure A must have the same height that the figure
B, and the figure C, as that of D, and that of F, equal
to G, and so of others.

For the Figures below, we shall mark for the
same reason, the Figures that are below are of the
same height as those above, as is the figure E, equal
in height to that of H and I, as great as the figure
K. These two Examples shall serve for all those that
we could make there.

Horizon

F

G

D

A

B

O

Horizon

E

K

I

H

12.4
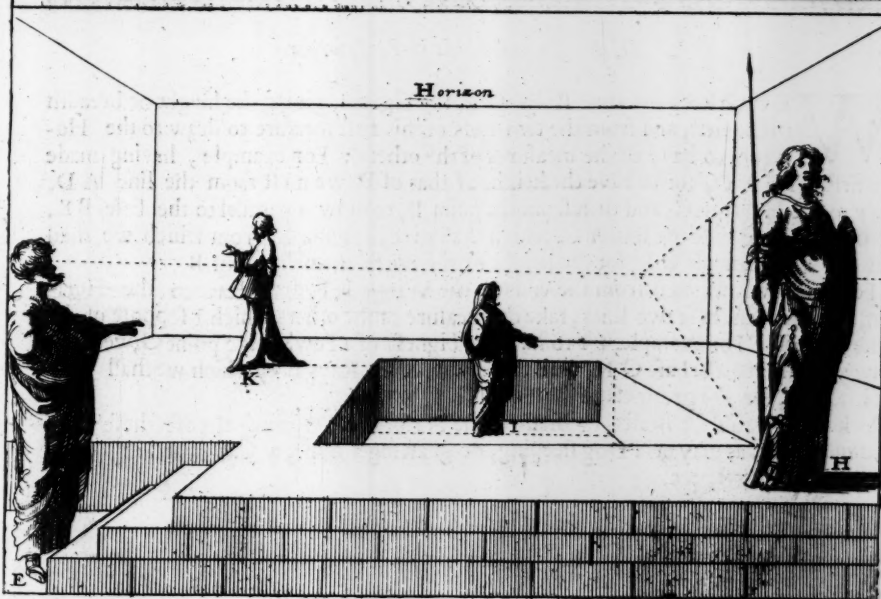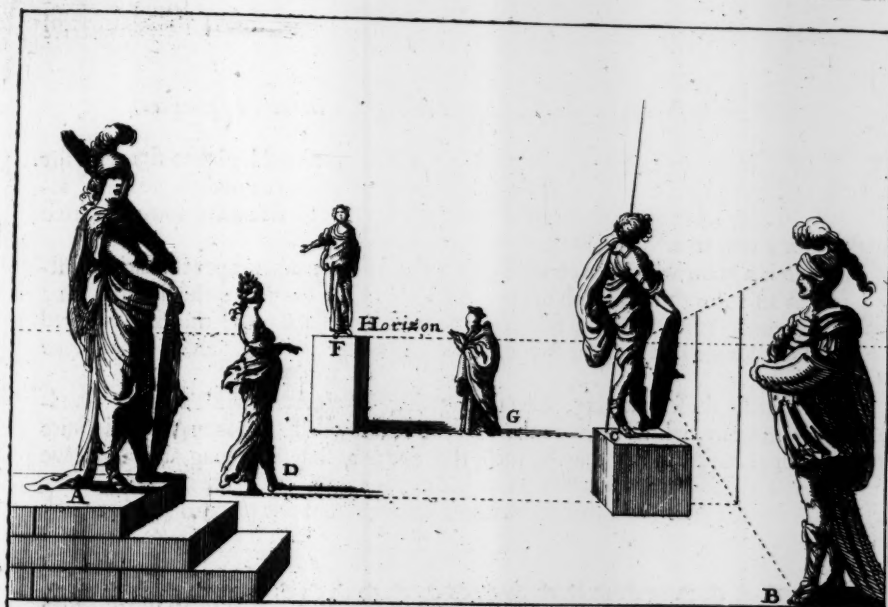
Of the Postures that we should give to Figures in the Perspectives.

WE must make choice of the Postures, which we should give to figures, for to deceive the eye, seeing that they are not all there good, as we have already said : Wherefore it seemed good to me to set down some, which might shew a way to invent others.

The first is a Man, which readeth being set : the second readeth a proclamation fastned to a Wall : the third playeth upon a Lute : the fourth sleepeth : the fifth sits on a rail, and turneth the back on the side of them that are two and two : the first marked with six look upon a design upon Paper, the other farther off seven, are about serious affairs

One might set those that play, that talk together, or entertain at a Table, or standing up, which write, which pray on their knees, in one word, one may set an infinite company of postures, so that they be such, that one may stay there long time : But we must never set those that are in action, for that deceiveth not to see always one Leg, or an Arm in the Air, nor those that run without stirring from one place to another.

Of Beasts and Birds in Perspective.

WE must keep the same Rules as in the Figures, giving the height or breadth to the first, and from the two ends of this first measure to draw to the Horizon, to have all the measures of the others : For example, having made the first horse A D, for to have the height of that of B, we must from the line A D, draw to the Horizon C, and then from the point B, to draw a parallel to the base B K, until that it do divide the line A C, which shall give the point K, from which we shall raise the Perpendicule K L, for the height of the horse from the point B

For the Fowls we must from the ends of the Wings E F, draw Rays to the Horizon, and between these two lines, take the measure of the others which I suppose of the same bigness For example, for to have the bigness of a Fowl at the point G, we must draw a parallel to the base G H, until that it divide the Rays E F, which we shall give the line H I, for the greatness of the Fowl G

When we would set Beasts, or Birds in the Perspectives we must choose those that are most at rest, as may be a Dog sleeping, or gnawing a Bone, a Cat watching of a Mouse, or a Parret, &c.

Horizon 5

6 7 3

1

E

G

H

Horizon C

B L

K

D

A
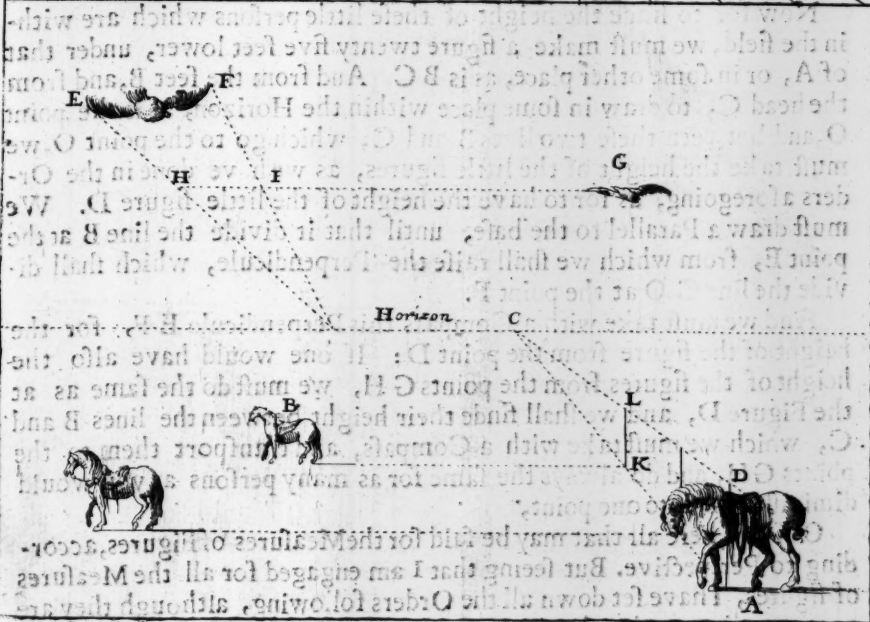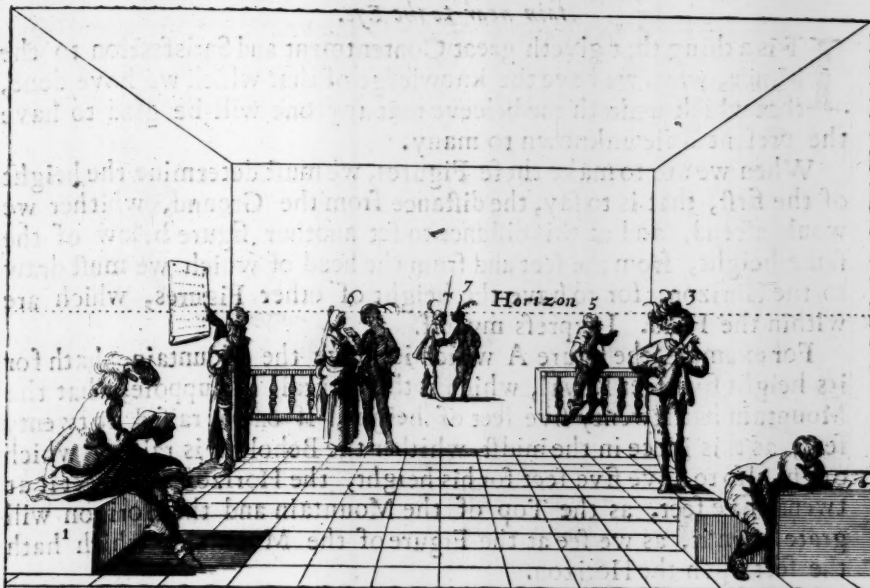
For to finde the height of Figures far removed, the first being upon a Mountain near to the Eye.

IT is a thing that giveth great Contentment and Satisfaction to the Minde, when we have the knowledge of that which we have done, that which maketh me beleeve that any one will be glad to have the prefent Rule unknown to many.

When we are to make thefe Figures, we muft determine the height of the firft, that is to fay, the diftance from the Ground, whither we would afcend, and at this diftance to fet another figure below of the fame height, from the feet and from the head of which we muft draw to the Horizon, for to have the height of other Figures, which are within the Field. I exprefs my felf.

For example, the figure A which is above the Mountain, hath for its height five feet Royal, which is the natural. I fuppofe, that the Mountain hath twenty five feet of height, if one be raifed up twenty feet, as this Piece in the midft whither the Beholder is raifed, which ought alfo to have five feet for his height, the Horizon will meet it at twenty five feet, as the Top of the Mountain and the Horizon will grate upon it, as we fee at the Figure of the Mountain, which hath the feet upon the Horizon.

Now for to finde the height of thefe little perfons which are within the field, we muft make a figure twenty five feet lower, under that of A, or in fome other place, as is B C. And from the feet B, and from the head C, to draw in fome place within the Horizon, as is the point O, and between thefe two lines B and C, which go to the point O, we muft take the height of the little figures, as we have done in the Orders aforegoing, as for to have the height of the little figure D. We muft draw a Parallel to the bafe; until that it divide the line B at the point E, from which we fhall raife the Perpendicule, which fhall divide the line C O at the point F.

And we muft take with a Compafs this Perpendicule E F, for the height of the figure from the point D: If one would have alfo the height of the figures from the points G H, we muft do the fame as at the Figure D, and we fhall finde their height between the lines B and C, which we muft take with a Compafs, and tranfport them to the points G H, and do always the fame for as many perfons as you would diminifh all unto one point,

Obferve here all that may be faid for the Meafures of Figures, according to Perfpective. But feeing that I am engaged for all the Meafures of figures, I have fet down all the Orders following, although they are not according to this Art.
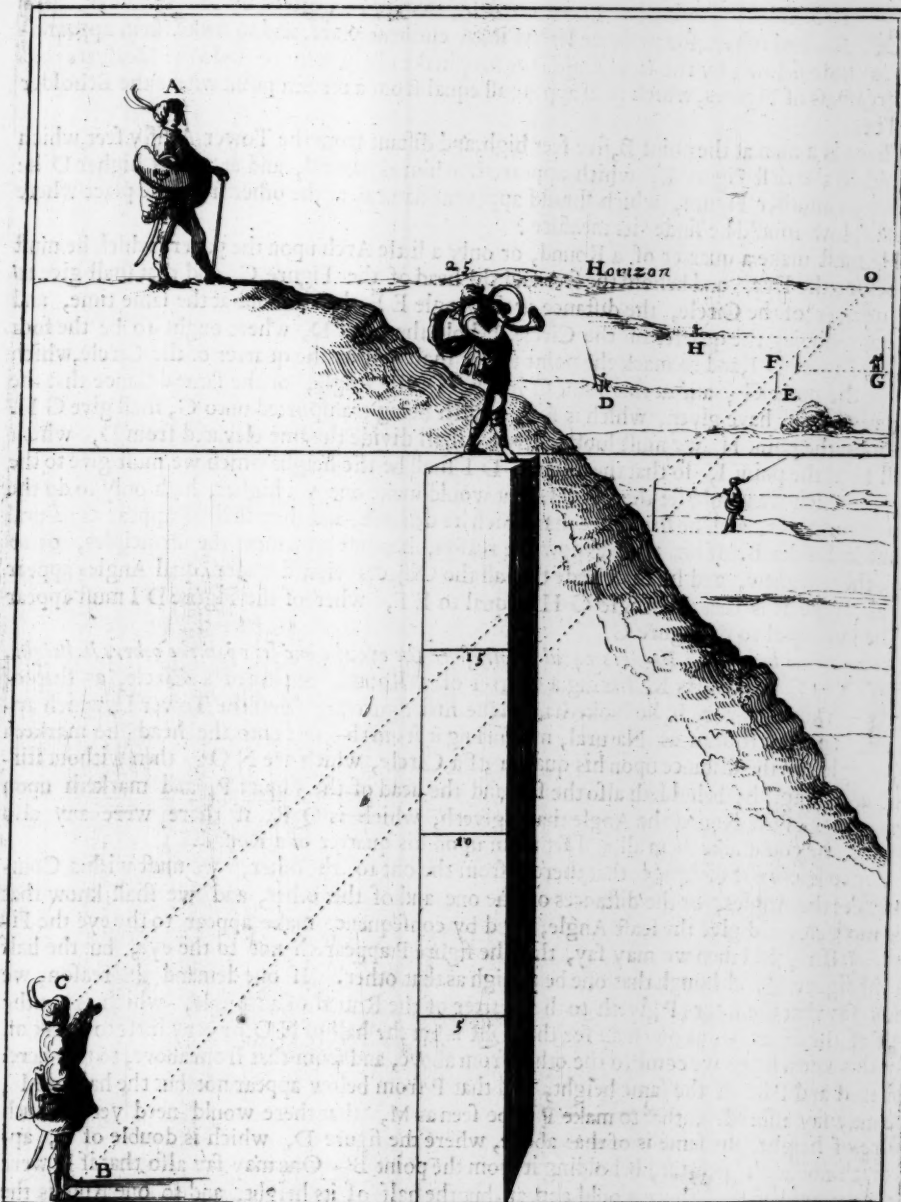
For to give the natural height, or such as one would to Figures elevated on high.

THAT we may omit nothing for the heights of Figures, we will set down also the two Rules following, whereof one hath already been given by *Albert Durer, Serlio*, and others, for to write letters in an eminent place, and to make them appear equal to those below : by the same reason we may make use of it for to finde the Measures and the greatness of Figures, which shall appear all equal from a certain point where the Beholder shall be.

There is a man at the point B, five feet high, and distant from the Tower A fifty feet, which beholdeth the first Figure C, which appeareth to him as natural, and at 30 feet higher D he would set another Figure, which should appear as natural as the other from the place where he is : How should he finde its measure ?

He must make a quarter of a Round, or only a little Arch upon the paper, which he must set before the Eye, and behold the feet and the head of the Figure C, and that shall give to the quarter of the Circle, the distance or the Angle E F, then he must at the same time, and without moving the quarter of the Circle, behold the point D, where ought to be the foot of the Figure D I, and to mark the point that it shall give at the quarter of the Circle, which is here the point G ; and at this point G he must set the Angle, or the same distance that the Figure C shall have given, which is E F, which being transported unto G, shall give G H. Then by the point H, we must look where we shall divide the line elevated from D, which shall be at the point I, so that the distance D I shall be the height which we must give to the Figure which we would set there. He that would make one yet higher, hath only to do the same operations, and he shall have that which he desireth, and they shall all appear as natural to the Beholder B. If one would know the reason, he must remember the Principles, or to look therein anew, and he shall finde that all the Objects view'd under equal Angles appear equal ; now it is that the Angle G H is equal to E F, whereof the Figure D I must appear in the eye equal to the figure C

For to know how much Figures equal diminish to the eye, the one set upon the others in height.

THE Beholders K, having a quarter of a Round, or part of a Circle, as that of the first figure B, he looketh upon the first figure M, from the Tower L, which appeared to him as Natural, measuring it from the feet unto the head ; he marketh the Angle, or the distance upon his quarter of a Circle, which are N O ; then without stirring any thing, he beholdeth also the feet and the head of the Figure P, and marketh upon his quarter of the Round the Angle that it giveth, which is Q R, if there were any also higher, he could take them all, and set them upon his quarter of a Round.

For to know the difference that there is from the one to the other, we must with a Compass take the Angles, or the distances of the one and of the other, and we shall know that the most elevated give the least Angle, and by consequence make appear to the eye the Figures lesser ; and then we may say, that the figure P appeareth not to the eye, but the half of the figure M, although that one be as high as that other. If one demand the reason, we shall say that the figure P giveth to the quarter of the Round of an Angle, which is but the half of the figure M, as one may see that Q R is but the half of N O, or very little to speak of. By this knowledge we come to the other from above, and from that from above, to this here: for if M and P be of the same height, and that P from below appear not but the half of M ; we may say assuredly, that to make P to be seen as M, that there would need yet as much more of height, the same is of that above, where the figure D, which is double of C, appeareth not at all greater, beholding it from the point B One may say also, that if D were not greater then C, there would appear but the half of its height, and so one Rule is the Reverse of the other.

As well the first as the second Order ought to be contracted, as the figures are made heretofore, where we shall have also assuredly the difference and proportion of the figures, as if they were taken at the Natural with this fourth of the Circle.
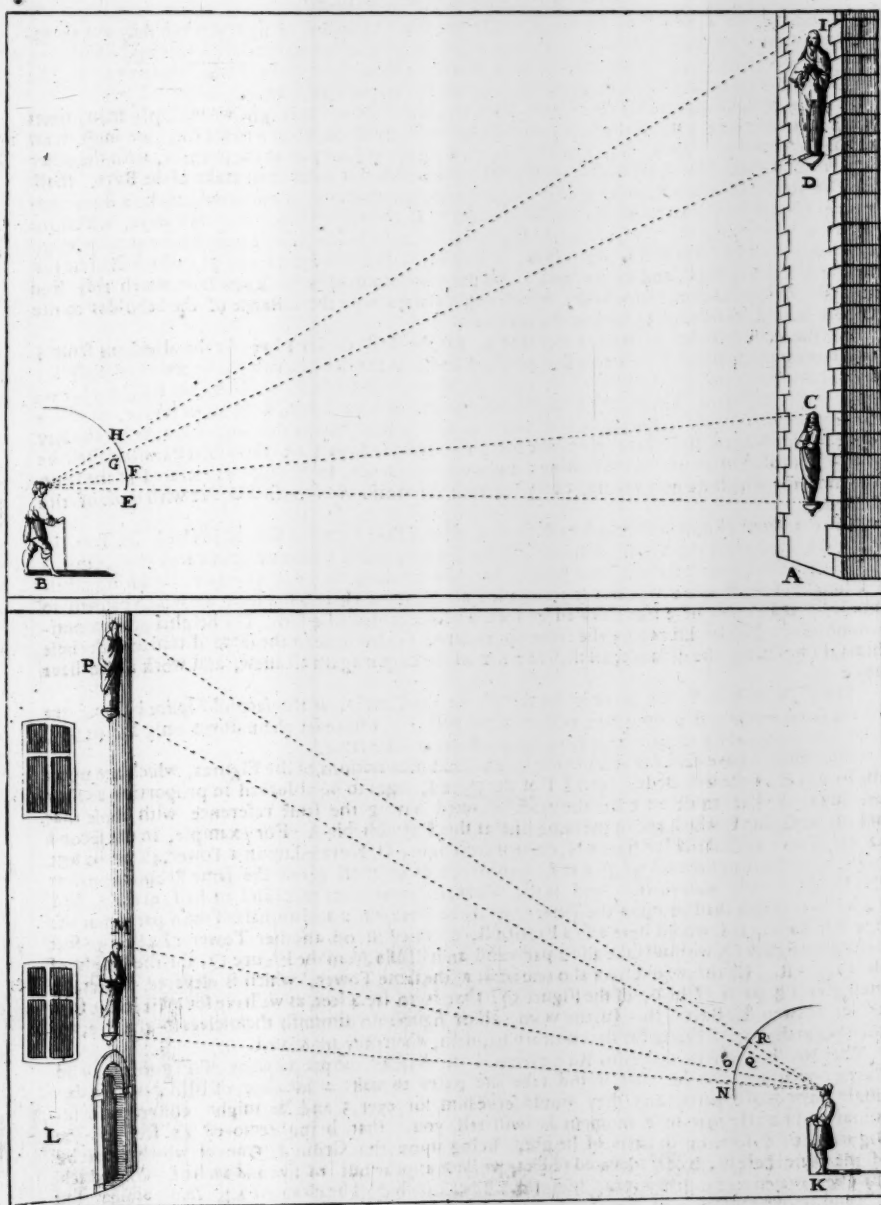
Of Measures for the Figures elevated.

Concerning that which we are speaking of, for the diminution of figures when they are elevated, we must draw the Measures in proportion to those which we would elevate in the Pictures, whether we do set them upon the Mountains, upon the Houses, or upon the Clouds in the Air. The two Orders that we are about to give, shall render the Method very easie.

For the first, I suppose that the man A is six feet high, the which height we multiply many times upon a plumb line B upon the base; and from these divisions from 6 to six feet, we must draw to the Head of the Figure A; Then having set a leg of the Compass at the point A, with the other leg we must make the Arch C D, and the sections which this Arch shall make of the Rays, shall be the Measures which we must give to the Figures, for example, if one would make a figure appeare Elevated 42 feet we must take the draught E D, which divideth the 2 last Rays, which we must transport to F, which is elevated 42 feet upon the same base A B. If we would have another at 30 feet high, we must take the draught G H, which divideth the Rays 30 and 36, which shall be the height of the Figure P, and so of others. All the concernment is to know how much this line B ought to approach or retire back, which ought always to be the distance of the beholder to the Object beheld, as here of 30 feet, or thereabouts.

For the second Order, instead of this line B, in the first Order I have set the divisions from 6 to 6 feet upon the base I T, the two first points I and 6 ought to be drawn to the point of sight K, for to have between these two Rays I K, 6 K, the Measure of six feet, which is the height that we give to the Figures. Then from all these other Measures from 6 to 6, unto 48 or more, if there be any, we must draw to the point of distance L, and at the sections that we shall make of the Ray 6 K; we must draw little Parallels to the base, between the Rays I 6; the which Parallels shall be the heights of figures within the sinking; and by consequence, for the figures elevated at the same distance, the which we may verifie, carrying back the Measures of the first Order with those of the second.

He that would know how much each figure is diminished from the first which hath six feet, he hath but only to take the height of that which he desireth with a Compass, and carry the Compass so open upon the little scale M, and he shall have that he desireth. For example, if having taken the height of the figure P we carry it upon the scale M, it will give but 4 feet, the which causeth to know, that a Figure of 6 feet elevated 30 feet, will appear but of 4 feet. The heights or diminutions of others shall be known by the same operations, so that it be in the same distance with these here; if one change the distance, all the Orders must be begun again all anew, and work as we have done.

The Figures V X Y, which are in the Air above the Clouds, at the second Figure below, are of the same height and proportion as that in the first: I have set them down only for to see, that although that the Orders be different, the effects are the same.

That which I have said for to finde the heights and diminutions of the Figures, which are upon the base A B of the first Order, and I T of the second, ought to be observed in proportion as they are sunk, and it must be that the most elevated having the same reference with those that are on the Ground, which are in the same line as this F p with this A. For example, in the second Order, if over against the last figure N, there were a figure O, Elevated upon a Tower, 48 or 50 feet high, what Measures should we give it? I answer, that we must give it the same Proportion that this N, shall have with the I. And as the last N, containeth but twice and an half, of the 6, the I hath, this O which shall be upon the Tower, ought to have but 2 and an half of the 6 parts that the figure N hath. If I would have also a Figure R, Elevated upon another Tower of 48 or 50 feet before the figure Q, we must take also 2 parts and an half of 6, from the Figure Q, for the height of the Figure R. He that would have also one in S, at the same Tower, which is elevated 30 feet, he must give it 4 parts of the 6, of the Figure Q, that is to say, 4 feet, as we have found it in the first Order, between the Rays G H. In one word, all the figures do diminish themselves to the Eye, according as they are elevated, as the contrary hapneth, when they are abased.

That which ought to make this Rule esteemed is, that all the proportions of Figures may be learned by heart, for he that would take the pains to make a Measure of this, where he might joyn more parts, and they would serve him for ever; and he might render it so familiar to himself, that in a moment he will tell you, that being removed 35 feet, if the Figure hath 6 feet, or 6 parts of height, being upon the Ground, One of which shall be of the same height, being elevated 12 feet, will not appear but of five and an half. That which shall be evated to 18, shall appear but of 5. That which shall be elevated 24, shall appear but of 4 and an half. That of 30 but of 4. That of 36 of 3 feet; And that of 42 but of 2 feet and an half; And so proceeding from 6 to 6, as I had done, if the paper would have sufficed it; It is enough, that it is known how we ought to do, for to set here a greater number thereof.
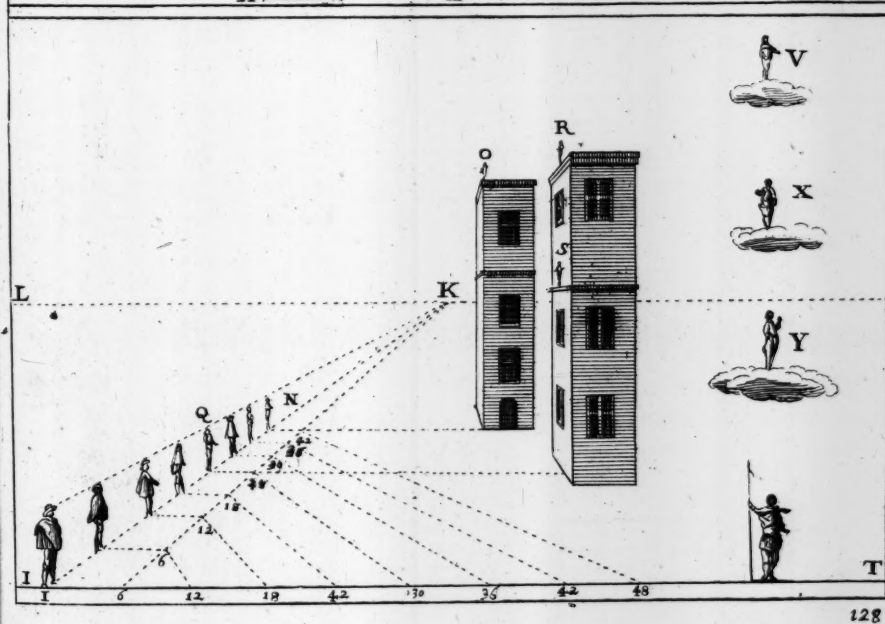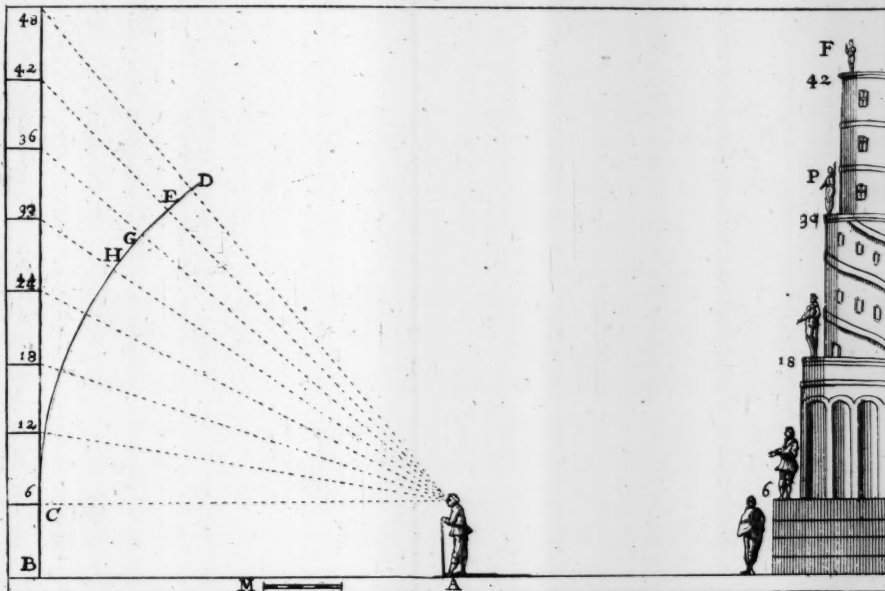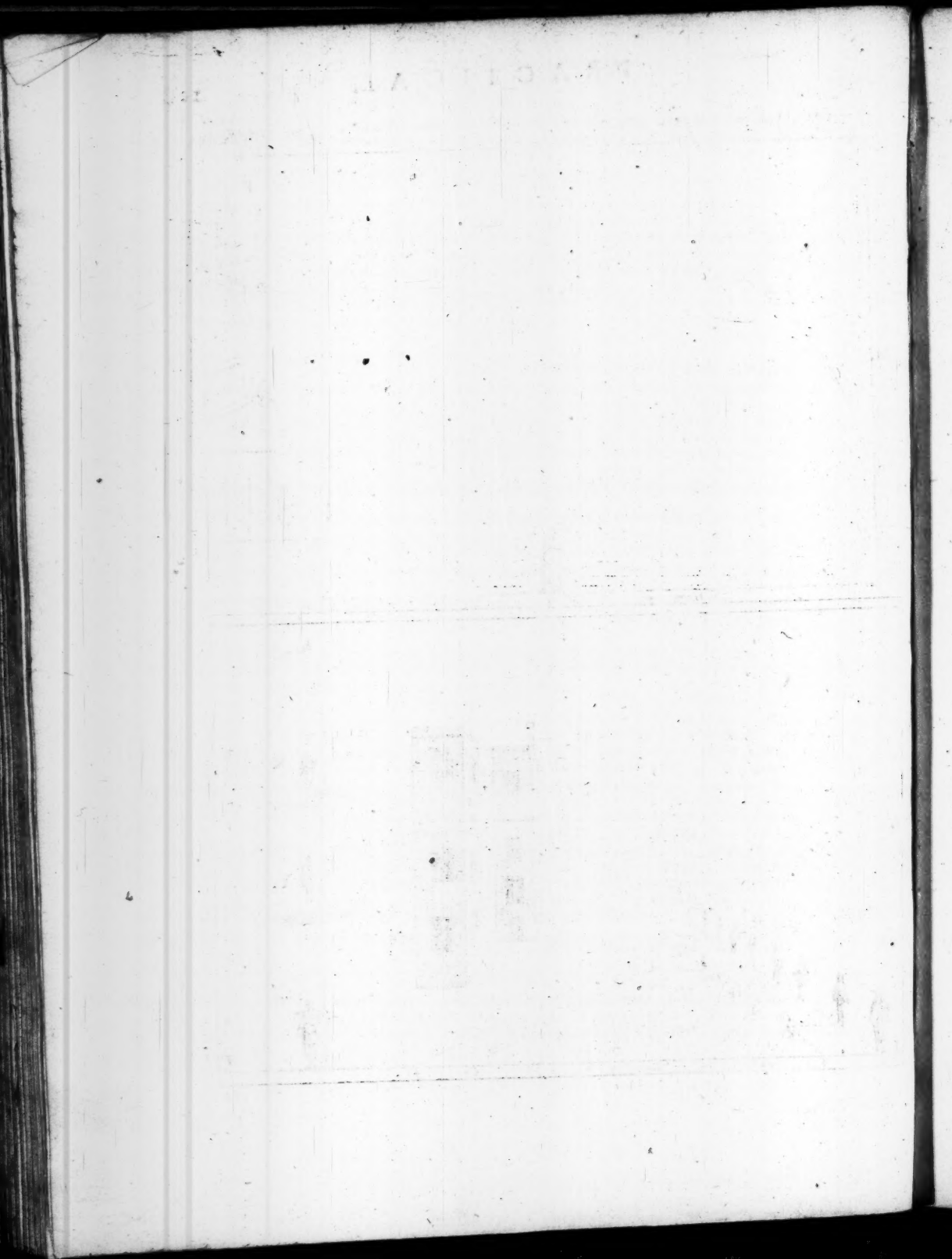
ORDERS

FOR TO FIND THE

NATURAL SHADOVVS

AS WELL BY THE

SUN AND BY A TORCH

AS BY A

CANDLE

AND A

LAMP.
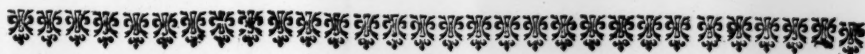
The Original of Shadows.

For to define the natural Shadow, we fay not that it is an entire Privation of light; for that would be to fay a perfect obfcurity, where we fhould fee as little the objects as their fhadows, but we underftand a diminution of Light, cau-fed by the interpofition of fome body which is not tranfparent, the which receiving the Sun, or the clearnefs which fhould caft it felf upon the plane where it is fet, gi-veth there a fhadow of its fhape, for the light being Comunicative of it felf, produceth it felf upon all that which is not hidden from it, & Extendeth it felf upon all that is plain and united: but if it meet which the leaft Elevation, this hinderance caufeth it to make a Shadow, which rendreth upon the Plane the forme and figure of that which is Enlightned

The diverfity of lights, maketh a diverfity of fhadows for if the body that enlight-neth is greater then that which is enlightned the fhadow will be leffer then the body if they be equall, the fhadow will be equall to the Body enlightned : but if the light be leffer then the Object, the fhadow will ftill be more and more the greater.

For to und rftand this the better, we will make the three figures following, which fhall ferve us as a foundation, for the Rules which we fhall give.

The firft fheweth that the Body of light A B, being much greater then the En-lightned C D, it Enlightneth more then the half of the Object, the which maketh it to give a fhadow with a Point and frame it into a Pyramide, whereof the Sun is the Bafe. This truth is fhewed in the Eclipfe of the Moon, which is feldom wholly Covered with the fhadow of the earth, which neverthelefs exceedeth it in greatnefs forty times, by reafon that the Sun, which is the body full of light, is an hundred fixty fix times, and more, greater then the Earth, which it enlightneth more then the half; and by confequencee caufeth to give a fhadow to it in a point.

The fecond, having the body of light F G, equal in greatnefs to the enlightned H I, it enlightneth the half of the Object, and giveth its fhadow parallel H I K L.

The third maketh appear, that the lightfome body, or the light M, being lefs then that which is enlightned N O, is not enlightned by the half, the which caufeth a fhadow unto it, N O P Q, which enlarg th it felf according as it is removed, from the object, and maketh a Pyramide. whereof the light is the point.

Llij
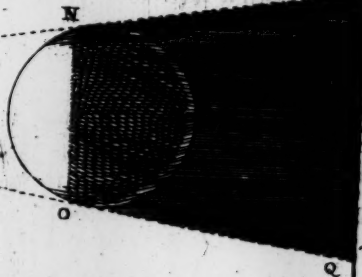
Of the difference of Shadows.

BY that which I have spoken in the Leaf aforegoing, we must conclude, that one and the same Object may give divers shapes of shadows or projections, although that it be enlightned of the same side; by reason that the Sun giveth it of one fashion, the Torch of another, and the Day doth not frame it.

The Sun rendreth always the shadow equal to the object, that is to say, by parallel, as the first figure sheweth it. I shall teach in the Leaves following, how we ought to use this method, and to give to every object the natural shadow, which the Sun would cause it to have; All Painters, Gravers and others may, if they please, observe these Rules, when they would make any thing pleasing, and not to take the Rule of the Candle, or Torch, for this; as divers have done.

The shadow of the Torch is not given by paral'els, but by Rays, which issue from the same Center, that which causeth the shadow is never equal to the body, but more large, and is greater always according as it is removed, the which may be seen in the second figure, where the shadow is larger then in the first, although that the Cubes of the one and the other be of equal breadth and height. See then how one should be much deceived if one should make the shadow of a Torch, like as that of the Sun, and of the Sun, as that of the Candle, seeing that the difference is so notable.

There is a third sort of shadow, which is neither of the Sun, nor of a Torch, but only caused by a fair Day, the which having not strength enough for to frame the figure, rendreth only a confused blackness at the object, as in the third figure. Now this hath no Rule, wherefore every one giveth it, and practiceth it according to his fancy,

All these shadows as well of the Sun, as of the Torch, and of the Day, ought to be more dark then the parts of the objects which are not enlightned, as A, it not so dark as B, by reason that A receiveth the reflection of the clearness, which is about it : and B, hath not the reflection that A, which is in obscurity. We must observe also, that the part of the shadow most distant from the object, is also more dark, then the part nearer as G, is darker then H, by reason that A cannot communicate that little reflection which it receiveth unto G, as it doth to H.

1. Figure

2. Figure

3. Figure
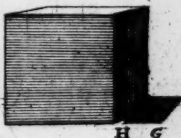
For to finde the shape of the Shadows.

WE shall obferve at the beginning of this Book, that the Definition of Perfpective is to give upon a Plane perpendicular to the Horizon, the Reprefentation of Objects which are upon the Ground, or upon a Plane Horizontal: And for fhadows, it is altogether contrary ; feeing that one fuppofeth a Body elevated upon the Plane, the which being enlightned, cafteth its fhadow upon the fame Plane, as we fee, that the Body A giveth upon the Plane the fhadow B ; for to finde the fhadows we muft fuppofe two things, the Light and a Body : The Light, although it be contrary to it, it is that neverthelefs which giveth it its Being, and the Body or the Object giveth it its fhape and its figure. I fhall not difcourfe here but of fhadows, for I fuppofe that we have learned to fet the Bodies or Objects into Perfpective.

For to underftand thefe fhadows more eafily, and render the Orders following more eafie ; we muft mark that we muft make ufe of two points : the one of the foot of the light, which ought always to be taken upon the Plane where the Object is placed; and the other of the Torch or lightfom Body ; feeing that the Rule is general for the Sun and for the Torch, with this only difference, that the fhadow of the Sun is given by Parallel, and that of the Torch by the Ray of the fame Center. We will begin with that of the Torch, feeing that it will help the better to comprehend that of the Sun, which fhall follow.

We fay then for example, That if one would have the fhadow of the Cube A, as we fee B, that we muft from the point O, foot of the light, draw lines by all the Angles of the Plane of the Object, as here by the Plane of the Cube O D, O E, O F, O G : Then you muft draw other lines from the point of the light of the Torch by all the fame Angles elevated, and to continue thefe lines until that they divide the other lines drawn from the point O : for example, having from the point O drawn the line paffing by the Angle of the Plane D ; if one draw from the point C, a line paffing by the fame Angle elevated; this fhall divide the other at the point H, and the point H fhall be the fhadow of this Angle. If from the point C, we do the fame by all the Angles elevated, we fhall divide the lines of the Plane, at the points H I K L, the which points we muft joyn with right lines, and we fhall have the fhadow of the Cube, as is to be feen at the Figure above, and more clearly at that below.
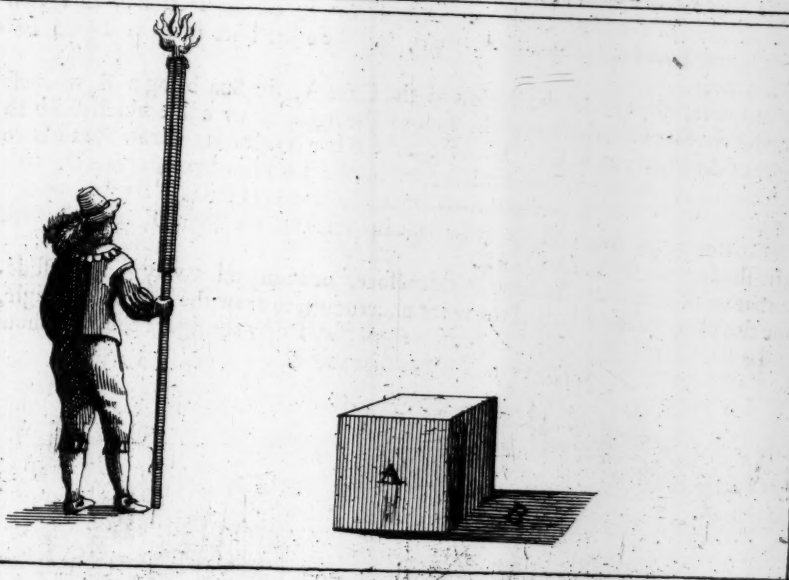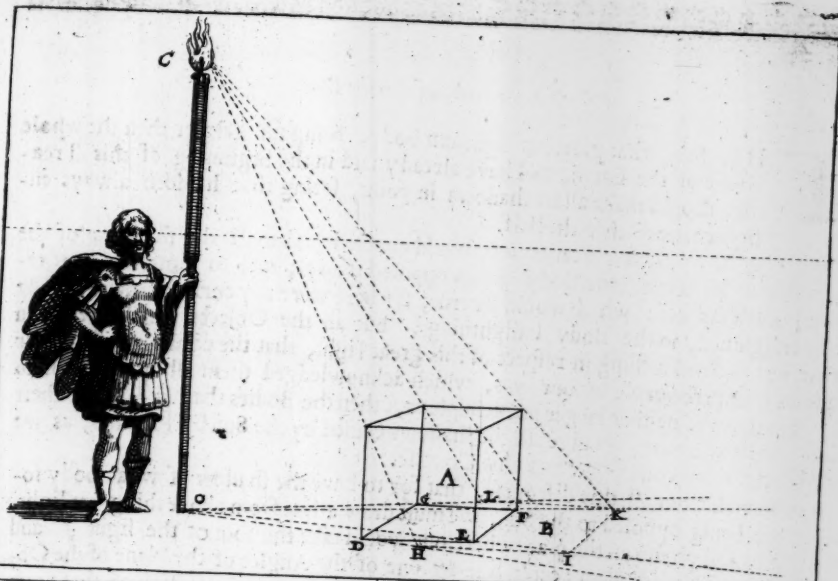
Of Shadows taken from the Sun.

THE Sun, that glorious lightfom body, being far greater then the whole Globe of the Earth, as I have already faid in the beginning of this Treatife, fhould make all its fhadows in point, feeing that he doth always enlighten more then the half.

In purfuit of this demonftration we fhould conclude, that all the fhadows of the Sun ought to be lefs then the Body that is oppofed unto it, and to diminifh as it removeth it felf far off: which would be true, if there were any correfpondency of the Body enlightned, to the Body enlightning: but all the Objects which are upon Earth, are fo fmall a thing in refpect of this great light, that the diminution of their fhadows is unperceivable by our eyes, which acknowledged them all equal, that is to fay, that they are neither larger nor ftreighter, then the Bodies that give them their fhape; for this reafon, we give all the fhadows caufed by the Sun by Parallels, as we have feen at the fecond Figure of this Treatife.

It followeth from all this difcourfe, that for to have the fhadow of what body foever it be, being oppofed to the Sun, we muft draw a line from above this great light, which may fall plumb at the place where one would take the foot of the light; and from this place to draw an occult line by one of the Angles of the Plane of the Object, and another of the Sun by the fame Angle elevated, and the fection of thefe two lines fhall fhew how far the fhadow muft go, all the other lines fhall be drawn Parallel unto thefe.

For example, for to take the fhadow of the Cube A, the Sun being at B, we muft from under the Sun C, which is as the foot of the light, draw a line which toucheth an Angle of the Plane, as C D. Then from the other Angles E, to draw Parallels to this: for to finde the end of the fhadow, we muft draw a line from the Sun B, paffing by the Angle elevated F, which fhall divide the line C D in G. Then drawing a Parallel to this by the Angle H, it will divide the line E at the point I, and we fhall have the fhadow of the Cube D G L.

He that would caufe the fhadows to caft before, or in any other way; he muft determine the place of the Sun, and the point underneath, to draw the lines of an Angle, and make all other lines parallel to that, as you may fee by the figure below, without repeating the Practick, which is the fame as that above.
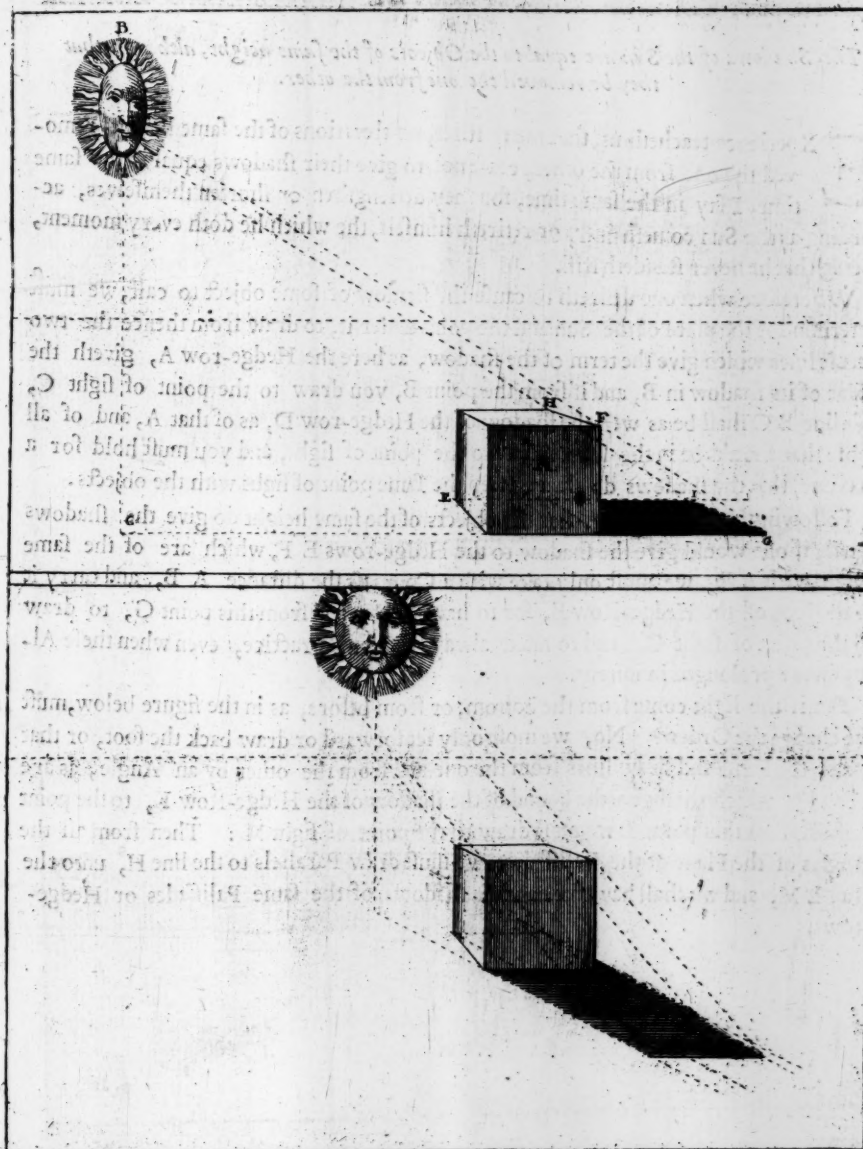
The Shadows of the Sun are equal to the Objects of the same height, although that they be removed the one from the other.

EXperience teacheth us, that many stiles, or elevations of the same height, removed the one from the other, cease not to give their shadows equal in the same time, I say in the same time, for they do lengthen or shorten themselves, according as the Sun cometh near, or retireth himself, the which he doth every moment, seeing that he never standeth still.

Wherefore when one desireth to cause the shadow of some object to cast, we must determine of the place of the Sun and the point under it, to draw from thence the two occult lines which give the term of the shadow, as here the Hedge-row A, giveth the point of its shadow in B, and if from the point B, you draw to the point of sight C, this line B C shall be as well the shadow of the Hedge-row D, as of that A, and of all those that should be in the same line unto the point of sight, and you must hold for a maxime, that the shadows do always keep the same point of sight with the objects.

Following this experience, that the objects of the same height do give the shadows equal, if one would give the shadow to the Hedge-rows E F, which are of the same height with A D; we must only take with a Compass the distance A B, and carry it to the foot of the Hedge-Row E, for to have E G ; and from this point G, to draw to the point of sight C, and to make always the same Practice, even when these Alleys were prolonged infinitely.

But if the light come from the bottom, or from before, as in the figure below, must we change the Order ? No, we most only set forward or draw back the foot, or that under the Sun, and draw lines from the one and from the other by an Angle, as are H and I, which shall give the bound of the shadow of the Hedge-Row K, to the point L ; and from this point L we must draw to the point of sight M : Then from all the Angles of the Plane of the Palissades, we must draw Parallels to the line H, unto the Ray L M, and we shall have the natural shadows of the same Palissades or Hedge-Rows.

Of the Shaddowes the South directly opposite to the Eye.
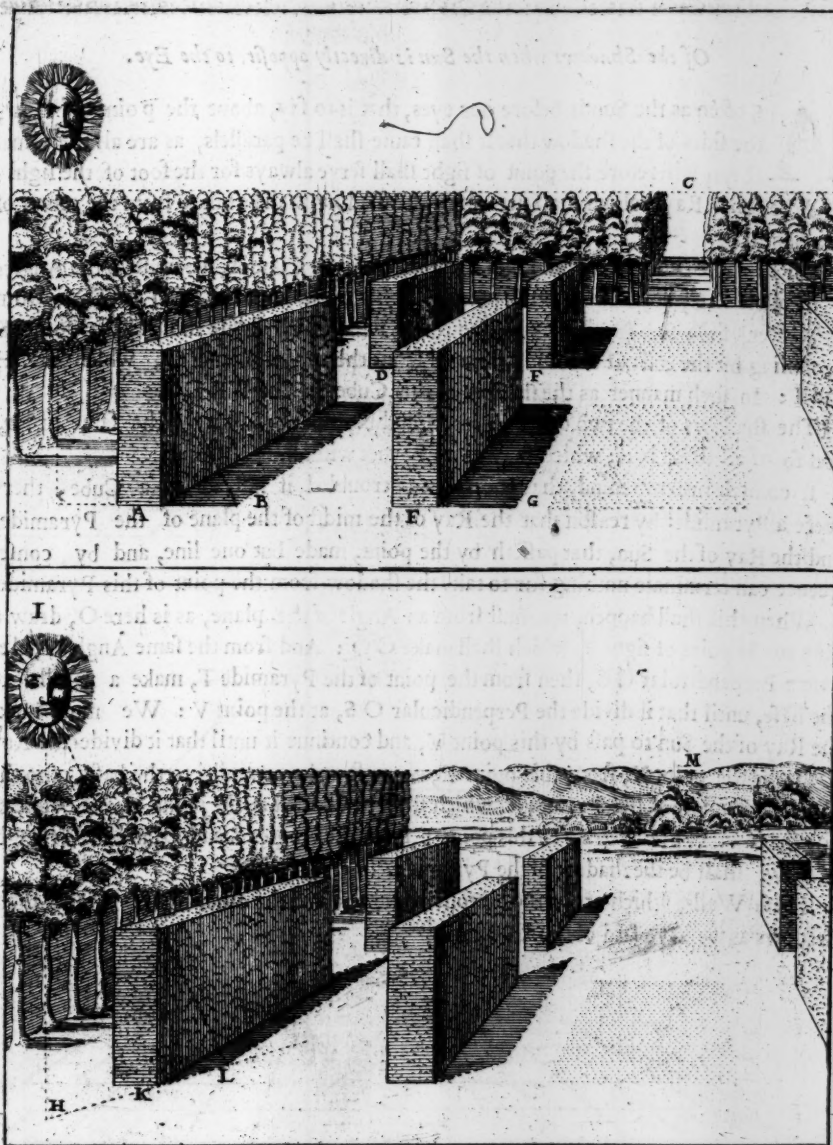
Of the Shadows when the Sun is directly opposite to the Eye.

AS often as the Sun is before our eyes, that is to say, above the point of fight; the fides of the fhadow that it fhall caufe fhall be parallels, as are all the vifual Rays; wherefore the point of fight fhall ferve always for the foot of the light ; And the other Ray, which fhall determine the fhadow, fhall be taken from the center of the Sun.

For example, when we would find the fhadow of the Cube A, we muft by the Angles of its plane B C, draw Rays to the point of fight D, as are B E, C F. Then from the center of the Sun G, draw alfo two Rays, which fhall divide thofe at the point K L, paffing by the ends of the lines elevated from the angles B and C, which are H and I : In fuch manner as the fhadow of this Cube fhall be B K L C.

The fhadows of the two other pieces M and N, fhall be taken by the fame order, and fo of all the others, which may there be met withall.

It cometh into my mind, that one might be troubled, if inftead of a Cube, there were a Pyramide: by reafon that the Ray of the midft of the plane of the Pyramide, and the Ray of the Sun, that paffeth by the point, made but one line, and by confequence can terminate nothing for to take the fhadow from the point of this Pyramide.

When this fhall happen, we muft from an Angle of the plane, as is here O, draw a Ray to the point of fight P, which fhall make O Q : And from the fame Angle O, elevate a Perpendicular O S, then from the point of the Pyramide T, make a parallel to the bafe, until that it divide the Perpendicular O S, at the point V : We muft make the Ray of the Sun to pafs by this point V, and continue it until that it divide the Ray O Q, at the point X, from this point X, we muft make a parallel to the bafe, unto the Ray of the midft of the Pyramide, which fhall be divided at the point Y, the bound of the fhadow: We muft draw to this point Y, from the Angles Z and O, and the Triangle Z Y O, fhall be the fhadow of the Pyramide.

Thefe Walls, which are at the bottom of the one and the other figures, take their fhadows as we have faid of the Cube A.
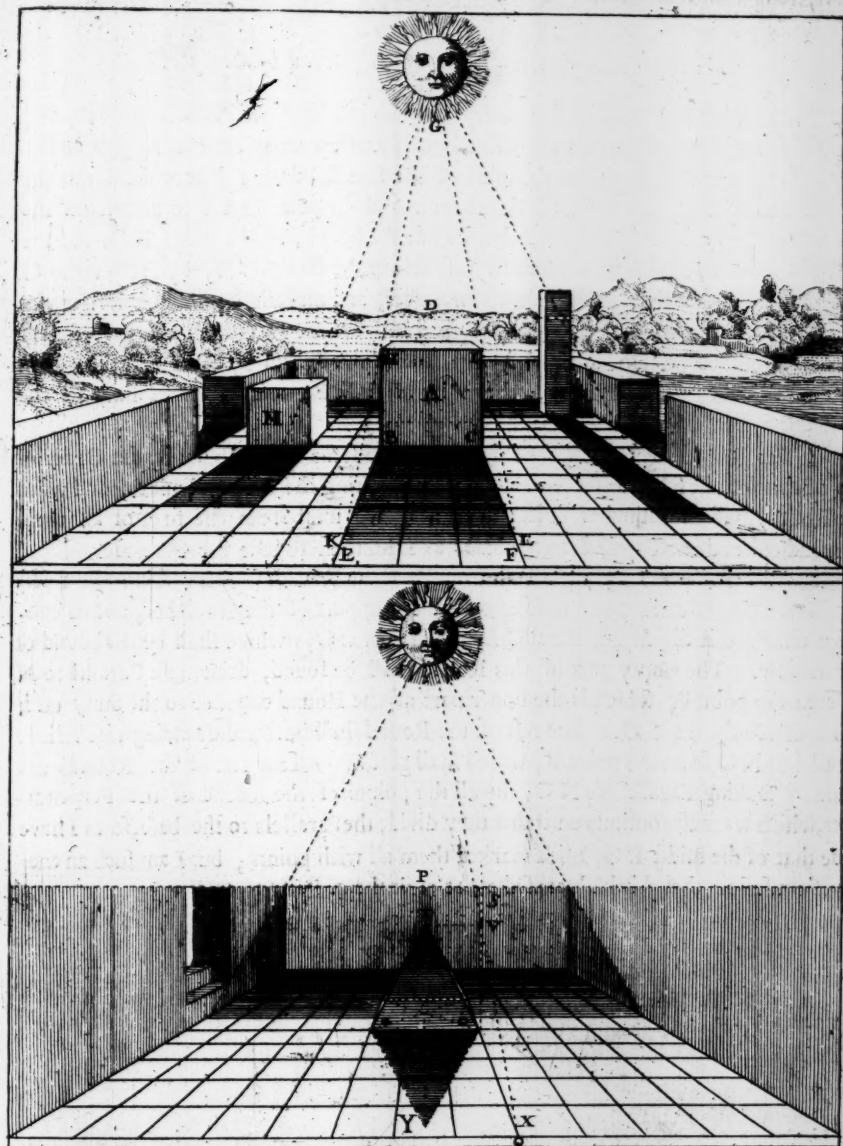
For to give the shadow of the Objects pierced by the light.

WHEN the Object is square, or of a right line, we must from the point A from under the Sun, draw lines Parallels from all the Angles of the Plane : Then from the midst of the Sun B, draw a line to the Angle the farthest removed C, which shall divide the line A at the point D, and to draw from the point D to the point of sight E, until that it finde the last line of the Plane F: for to have the rest of the shadows, we must draw Parallels to the line B C D, by the corners G H I, by reason that the Sun enlightneth two faces, and maketh the shadow larger, as is to be seen in the first figure, that G C and H I are the Diagonals of these square Pieces enlightned on two sides ; and where these lines drawn by C G and H I shall divide the line A, we must draw to the point of sight E, and we shall have all the Projection, or the shadow of the Object.

If it be a Round, as in the second figure, we must make the Round by the Order of the Arches on the side, as fol. 62. and 63 by elevating the Perpendiculars, and when the Round shall be framed with its thicknesses, we must from the foot of all these Perpendiculars draw Parallels to the base, as L K, then to take for the under-part of the Sun L, which is the Parallel of the midst of the Round. Then from the midst of the Sun M, to draw a line passing by the upper part of the Round N, and to continue until that it divide this Parallel L, at the point O, which shall be the bound of the shadow. The empty part of this Round shall be found, drawing a Parallel to N O from the point P, which is the upper part of the Round opposite to the Sun, until that it divide the line I O. The rest of the Round shall be found drawing also a little Parallel to N O from the point R, which shall give S. All the rest of the Rounds are found by making Parallels to N O, by all the points of the Round of the Perpendicules, which we must continue until that they divide the Parallels to the base, so as I have made that of the midst L O, I had marked them all with points ; but I am such an enemy of confusion, that this hath caused me to omit them.
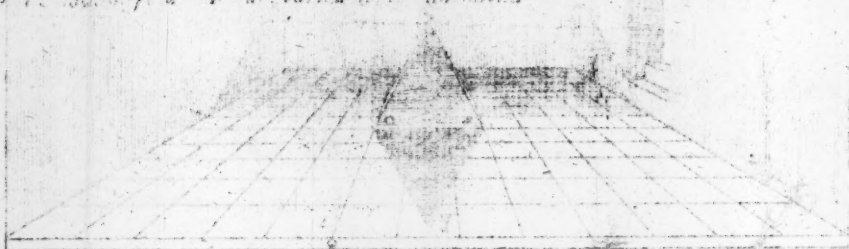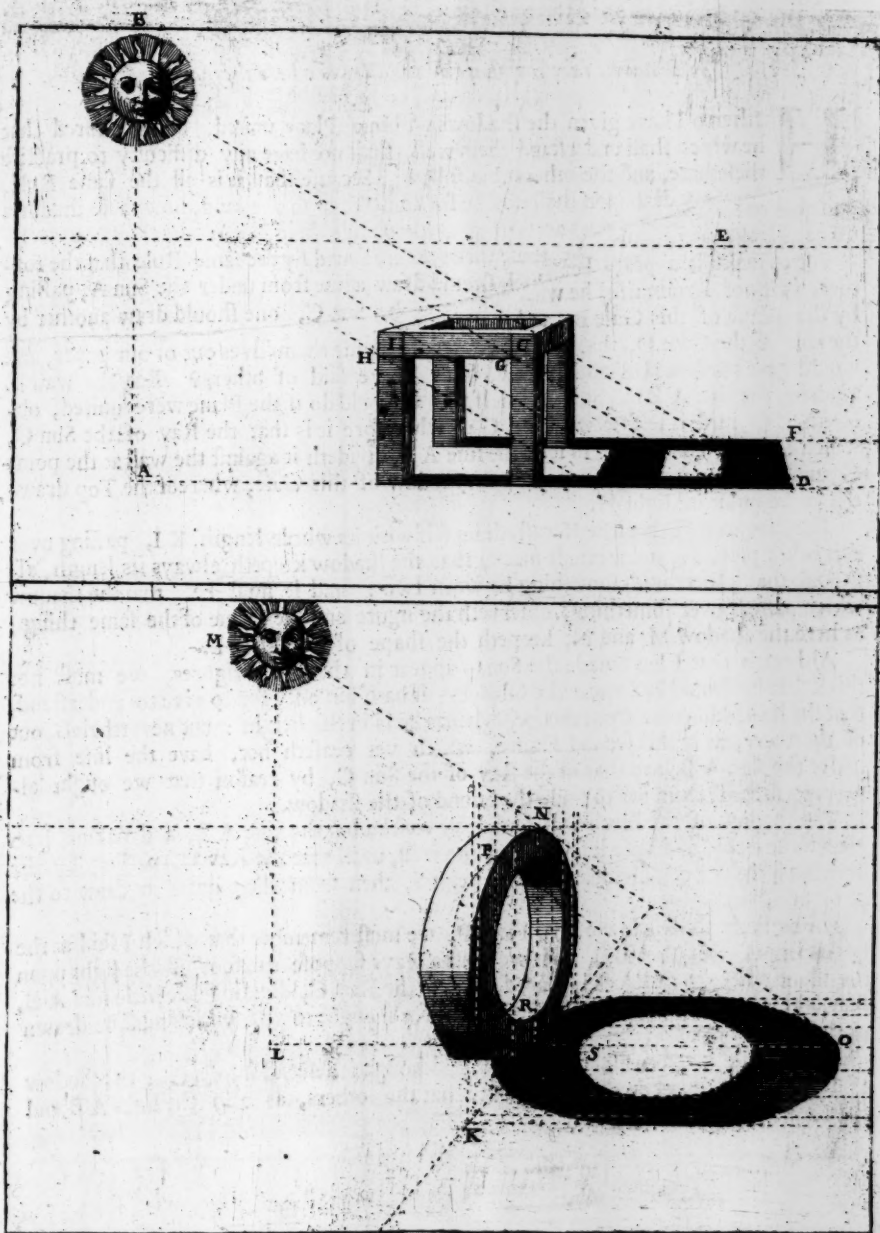
The Shadows take the shape of the Planes where they are cast.

Hitherto I have given the shadows within a Plane united, being assured that he which shall understand them well, shall not have any difficulty to practise these here, and the others that follow ; because that it is all the same Rule, and that one only direction shall suffice for to make to understand, how these shadows do raise and abase themselves according as they finde their Planes.

For to make it appear, that these shadows are found by the same Rule that the former, is it not certain that he which should draw a line from under the Sun A, passing by the Plane of this Gate B, and that from the Sun C, one should draw another by the top of the Gate D, that these lines would divide themselves out of our paper, and would give the bound of the shadow, so as I have said of others ? But the wall E hindring the line A B to prolong it self, as it would do if the Plane were united, obligeth it to raise it self as we see E G : wherefore it is that the Ray of the Sun C, which ought to go very far to seek the line A B, divideth it against the wall at the point G, and there marketh the shape, or the shadow of this Gate, whereof the Top draweth to the point of sight H.

The shadow of this piece K casteth its self with its whole length K I, passing over this other piece I ; and we must mark, that the shadow keepeth always its length, although that it meet with something between two : and it must be, that the shadow which passeth over something, observeth the figure and the forme of the same thing ; as here the shadow M and N, keepeth the shape of the Piece L.

Although that I have made the Sun to appear in the other figures, we must not think that he should be so near the Objects ; it hath bin only for to give to understand, that the Rays do come from thence, whenas he is in this height : but nevertheless, out of the Piece, as in this second Figure, which yet ceaseth not, have the line from under the Sun A B, and that of the Ray of the Sun C, by reason that we ought always to suppose them for to finde the bound of the shadow.

The shadow of the Piece O is found, by continuing the line A B, and making it to ascend the steps, and raise it self against the wall, until that the Ray C, passing by the corner of the Piece, divideth it at the point S, then from the point S to draw to the point of sight T.

For to finde the shadow of the Piece P, we must remember that which I said at the beginning of this Treatise, that we must always suppose the foot of the light upon the Plane where the Object is placed, and so the Ray C, dividing the little line A B, sheweth how far the shadow of the little piece P ought to go, which must be drawn to the point of sight T.

The Piece V giveth its shadow all along, although it descend into a Pit ; the shadow of the wall R is found by the same Order that the others, as also the lines A B, and the Ray C, cause it to be seen.
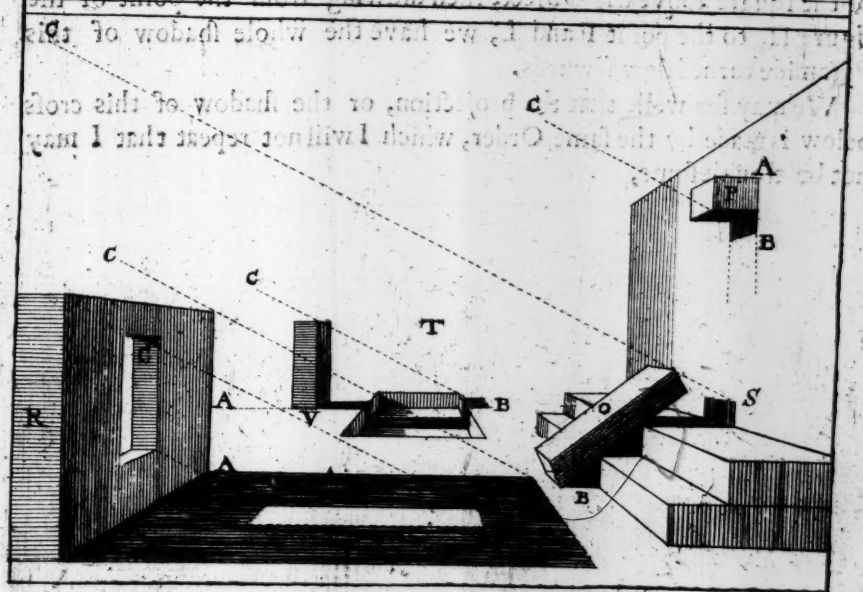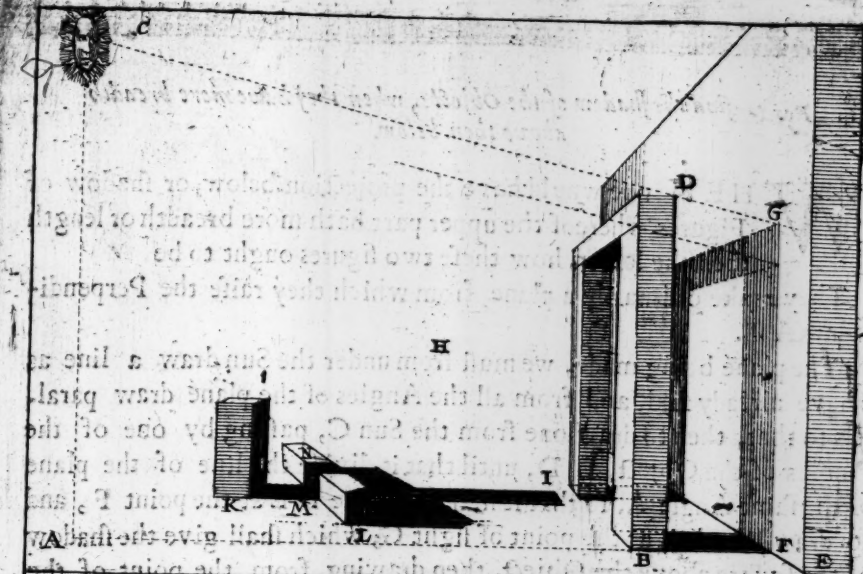
For to find the shadow of the Objects, when they have more breadth above then below.

WHEN one would have the projection below, or shadow of Figures, whereof the upper part hath more breadth or length then the lower, how these two figures ought to be.

They make ordinarily a plane, from which they raise the Perpendiculars A B.

The plane being made, we must from under the Sun draw a line as I have already said, and from all the Angles of the plane draw parallels to that, then to draw one from the Sun C, passing by one of the Angles of the Object, as D, until that it divide the line of the plane of the same Angle A, so that it make the line D E at the point F, and to draw E and F, at the point of sight G; which shall give the shadow of the square above the Object, then drawing from the point of the figure H, to the point F and L, we have the whole shadow of this Pyramide turned down-wards.

We may see well, that the projection, or the shadow of this cross below is made by the same Order, which I will not repeat that I may not be troublesome.

The figure labels visible in the diagrams include: C, G, D, A, A, B, L, B, H, A, F, E (upper figure), and C, A, A, B, B (lower figure).
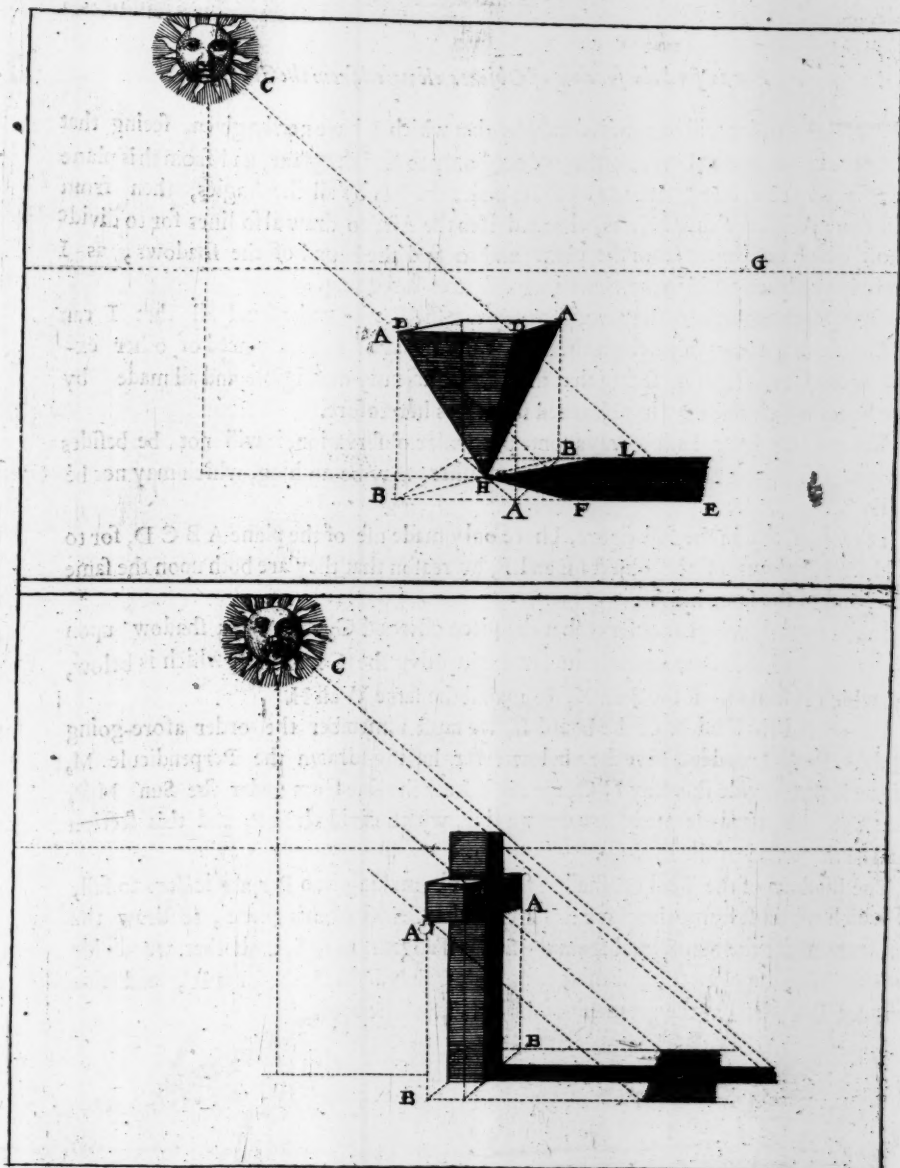
For to find the shadow of Objects elevated from the Ground.

THis order will be rendred easy by that which I have newly given, seeing that
in the one and in the other, we need only to find the plane, and from this plane
to draw lines, parallels to those under the Sun by all the Angles, then from
the same Angles of the Objects, elevated into the Air, to draw also lines for to divide
those which are drawn from the plane, and to find the bound of the shadows, as I
have here already said many times in the figures foregoing.

The which maketh me believe, that any one shall easily understand all that I can
make of the shadows taken from the Sun, without that there be any need of other ex-
plications for the figures, seeing that they are sufficiently intelligible, and all made by
the Rules which one may have learned by others heretofore.

But as every figure hath always some particular observation, it will not be besides
the purpose to give notice thereof, to the end there may be nothing, which may not be
easily understood.

I say then, that in the first figure, I have only made use of the plane A B C D, for to
find the shadows of the objects E and F, by reason that they are both upon the same
line, and of the same height.

In the second, we must observe that the piece of wood G, casting its shadow upon
the Wall H; this shadow maketh the same figure that the Corniche I, which is below,
the which is seen also at the Staff K, set against the same Wall H.

For to find the shadow of the board L, we must remember the order afore-going
of the Objects broader above then below : for having drawn the Perpendicule M,
where it shall divide the Ray N O, we must draw the line from under the Sun M P,
then from the board elevated L, to draw a line, which divideth M P, and this section
shall be the bound of the shadow.

The shadow of the Boul Q, shall be found also, making two Perpendiculars to fall,
of which we must frame the plane : Then by the Center of this plane, to draw the
line from under the Sun R, and from the Sun a Tangent, as Q S, until that we divide
the line R, at the point T, and also another V, which divideth the same R, and this
distance T V, shall be the greatness of the shadow of the boul.
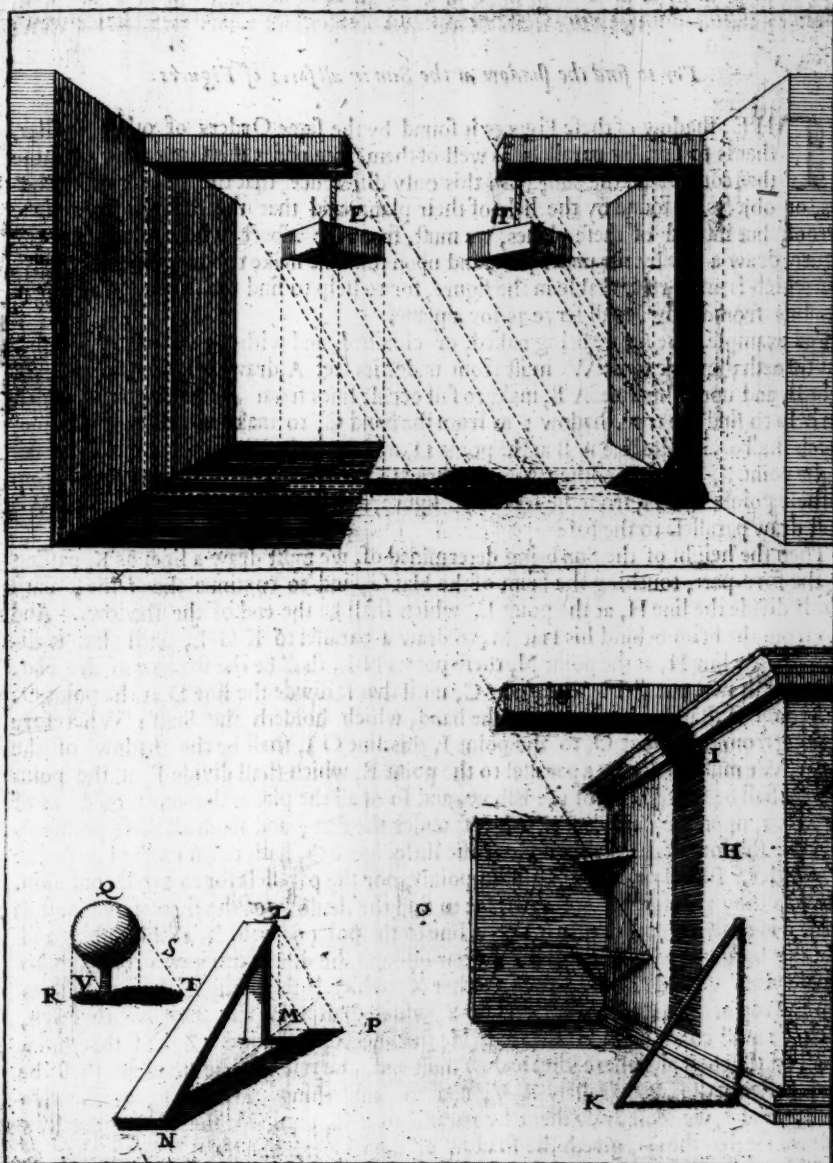
For to find the shadow at the Sun in all sorts of Figures.

THE shadow of these Figures is found by the same Orders of other bodies, that is to say, by parallels, as well of them from under the Figure, as of those that come from the Sun; with this only difference, that the shadow of the bodies, or objects, is found by the help of their plane, and that the figures have none thereof, but instead of these planes, we must, from the aspect whereby we see the Figure, draw a line by the under part, and upon this line make to fall perpendicularly, that which is most remarkable in the figure, for to help to find the shadow, and then this line from below, shall serve as for a plane.

For example, the figure being naked, or cloathed, and without a Cloak, as the first that turneth the back to us: We must from under its feet A, draw a line to the point of sight B, and upon this line A B, make to fall occult lines from all the points which can help to find the true shadow : as from the hand C, to make to fall a Plumb-line, which shall divide the line A B at the point D, and from the Elbow E, to make one fall to the point F, and yet another from the head G, which shall give the point H, from all these points D F H, from the feet of the figure, and from the end of his Staff I. We must draw parallels to the base.

Then the height of the Sun being determined of, we must draw a line, as K, passing by the fore-part, touching the brim of the Hat G, and to continue the same, until that it divide the line H, at the point L, which shall be the end of the shadow. And also from the brim behind his Hat M, to draw a parallel to K G L, until that it divide also the line H, at the point N, these points N L, shall be the shadow of the Hat. We must draw a parallel by the point C, until that it divide the line D, at the point O. This point O shall be the shadow of the hand, which holdeth the Staff : Wherefore drawing from this point O, to the point I, this line O I, shall be the shadow of the Staff : We must also draw a parallel to the point E, which shall divide F, at the point P, and shall be the shadow of the Elbow, and so of all the places that one would, as of the Knees, upon the parallels, which pass under the feet ; and from all these points to mark the shadow of the whole figure : the little figure Q, hath taken its shadow by the same order. I have not marked all the points, nor the parallels for to avoid confusion.

When they are cloathed at length, for to find the shadows of the figures, we must, as I have said draw from under their feet, a line to the point of sight R, as this S R, and from the bottom of the garment on the one side and the other, draw two parallels to the base, as T V, and between T V, another X, which is the midst of the figure. Then from the top of the Head, to draw a line Y, which shall be for the Ray of the Sun, which we must continue, until that it divide the line X, at the point Z, and this point Z shall be the bound, where the shadow must end, the rest of the shadow shall be drawn between the two parallels T V, and if any thing flow over, as the two folds ✠, and *, we must draw them by parallel to Y X, until that they divide the Ray Y, as we see that the ✠, giveth the shadow of the Elbow, and the *, giveth that of the folds of the Cloak.
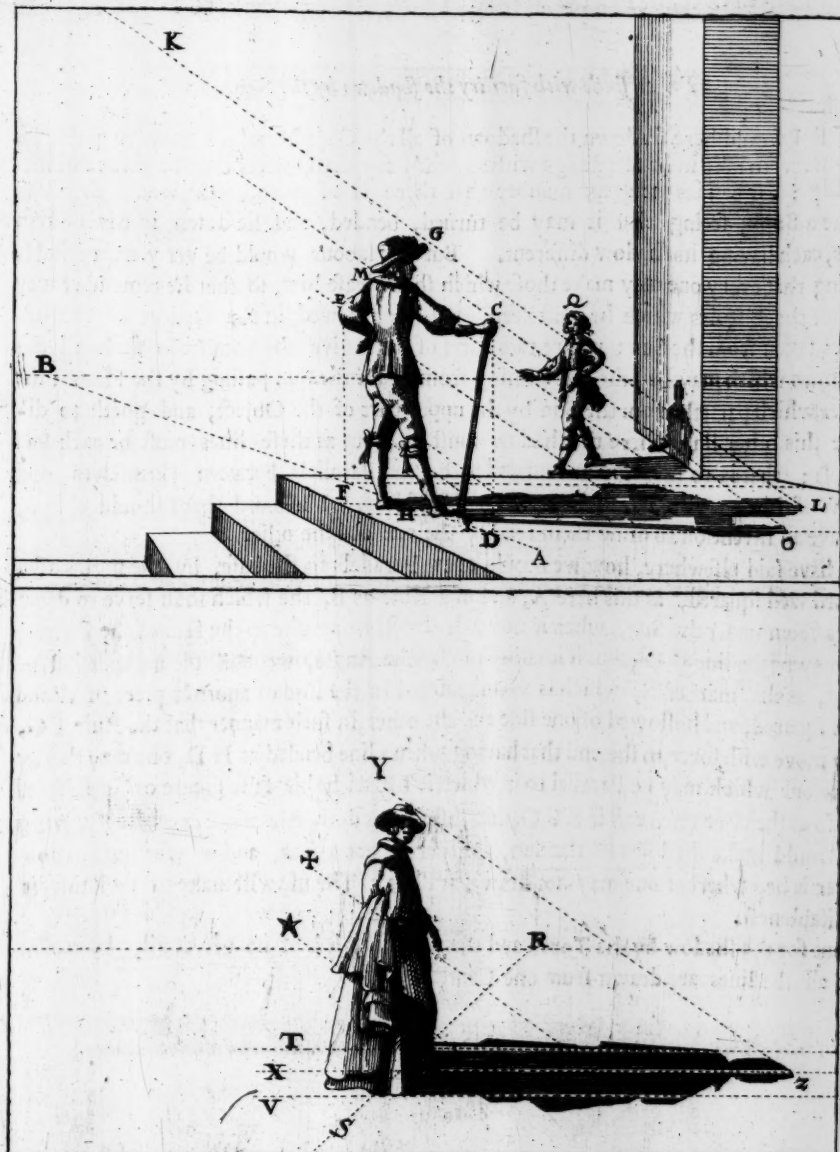
For to finde with facility the shadows by the Sun.

IF I would here set down the shadows of all the Objects which may be given, it were to take in hand a design without end, for the Objects may be given infinitely : for besides the great number that there is of them, each would suffice to make a Book, seeing that it may be turned, bended, and lie down in divers manners, each having its shadow different. But this labour would be ver y unprofitable seeing that every one may make those which shall please him, so that he remember well twoor three Rules which he must keep, as I have shewed in the Orders of the shadows taken from the Sun : where two forts of lines give the means to finde all the shadows which may be ; the one coming from under the Sun passing by the Plane ; the other which parteth from the Sun by the upper part of the Object, and goeth to divide this other line, where the shadow must go ; but as these lines must be each Parallels : that is to say, those from under the Sun Parallels between themselves, and those of the Sun also Parallels between themselves. I believed that I should oblige, I gave an Invention to draw them readily the one and the other.

I have said elsewhere, how we should draw Parallels to the base, by the means of a Board well squared, as this here A, and of a Rule as B, the which shall serve to draw lines from under the Sun, when it meeteth directly opposite to the face of the Object, as may be the line C D ; but if it enlighten by the Angle, we must use another instrument, as that marked E, which is a Rule fastned to the End of another piece of Wood well squared, and hollowed of one side and the other, in such manner that the Rule F G, may move with force, to the end that having taken a line bended as H D, one may therby make one which may be Parallel to it, which is I K with this false square or Grashoper, it is so as the Workmen call it E F G, this Instrument doth abbreviate exceedingly, when one would make shadows of the Sun, for there is not a line, and of what inclination soever it be, whereof one may not draw Parallels. The use will make us to know its profitableness.

But for the shadow by the Torch and the Candle , it is of no use at all, by reason that all the lines are drawn from one Center.
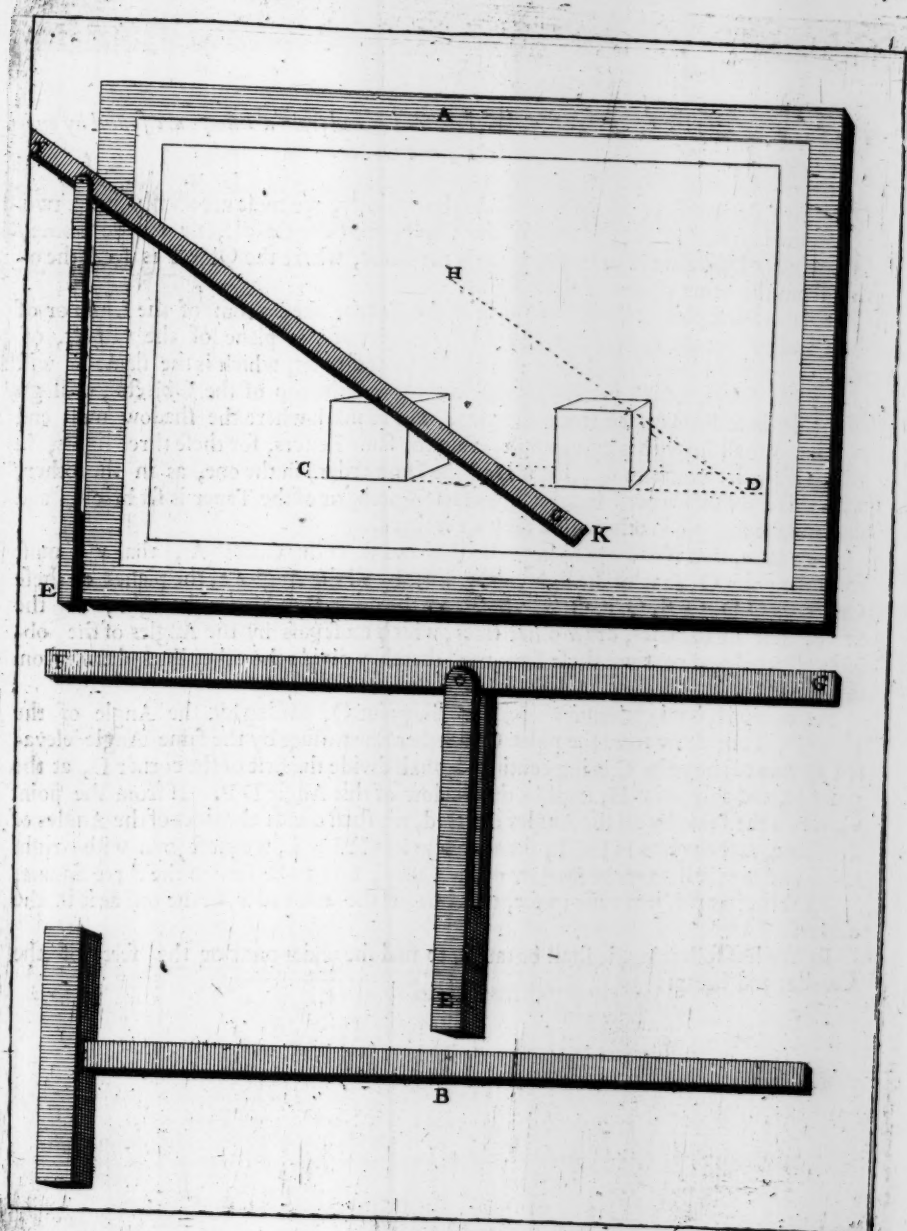
The Shadows taken from a Torch, from the Candle, and from a Lamp; are found by one and the same Order.

I Have already said, that for to finde the shadows, we must necessarily have two points, the one from the foot of the Torch, or of the Candle, or of the Lamp, which ought always to be found upon the Plane, where the Object is set : the other from the flame of one of these lights.

From the first point, which is the foot of the Torch, the bottom of the Lamp or of the Candle, we must draw Rays by all the Angles of the plane of the Object, of which one would have the shadow : And the second point, which is the flame, will give other Rays, which passing by the Angles from the top of the Objects, will go to divide these lines drawn from the plane, and to mark where the shadow must end it self : I shall shew this by example, using the same Letters, for these three lights, in which it shall be easie to see, that it is all the same order, in the one, as in the other, with this only difference, that the foot of the Torch, or of the Taper is set below, and that it must suppose in others that they set it there.

I say then, that if one would have the shadows B, of the Cubes A , that we must from the point O, foot of the light, draw lines by all the Angles of the planes of these Cubes, as O D, O E, O F, O G, Then from the point C, which is the light, or the fire of these Luminaries, draw other lines, which must pass by the Angles of the objects elevated, and continue these lines, until that they divide the other lines drawn from the point O.

For example, having drawn a line from the point O, passing by the Angle of the plane D, if one draw from the point C, another line passing by the same Angle elevated P, this of the point C being continued, shall divide the first of the corner D, at the point H, and this point H, shall be the shadow of this Angle D P. If from the point C, we do the same by all the Angles elevated, we shall divide the lines of the Angles of the plane, at the points H I K L, the which points H I K L, we must joyn with right lines; and we shall have the shadow of the Cubes, as is to be seen in the three figures,

By this example, it is easie to see, that it is all the same order, in the one as is in the others.

In the leaf following, it shall be taught to find the under parts or the feet of the Candles and Lamps.
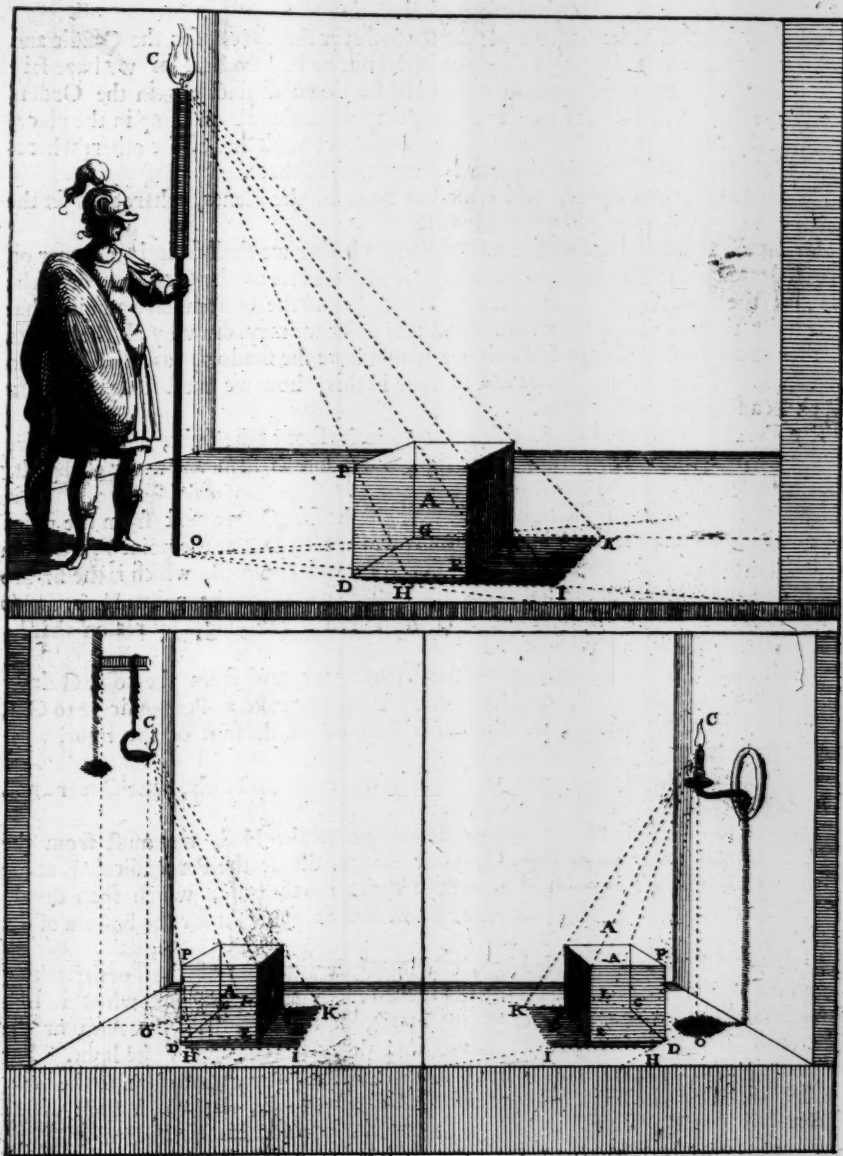
Of the foot of the light.

Eeing that the Order for to finde the shadows for the Torch, for the Candle an for the Lamp, is altogether the same in the one as in the other, as we have sai but now. There will be no more need to set down distinctions in the Order following : for when I shall set a Torch, one may set a Candle or Lamp in the place, by reason that the flame of the one hath the same effect with that of the other: wherefore from henceforth, I will use the word of light for all three.

For the foot of these lights, which must be upon all the Planes, where they set the Objects, they shall be found by this Method.

Having a Torch lighted within a Chamber, whether we shall set it in a corner on the side, or in the midst as this, it must be, that all the Parts of the Chamber, or of the Hall, as the Boards above and below, the sides and the bottom have a point that serve h for the foot of the light : that from this point we may draw by all the Angles of the Plane of the Object, of which we would have the shadow, as I shall shew in the leaf following, contenting my self to shew in this, how we must finde this point which I call the foot of the light.

The Torch being placed in A, this point A, is the foot of the light, and B the fire or the light of the Torch ; this fire or light B remaineth firm and never changeth, but the foot must be found on all sides.

For to have the foot of the light at the wall on the side C, we must from the point A draw a Parallel to the base, until that it divide the Ray D E at the point F, and from the point F to raise a Perpendicular F G ; Then from the point B, which is the fire, to draw another Parallel to the base until that it divide F G at the point H, and this point H shall be the foot of the light, as if the Torch were lying, by reason that its fire remaineth always at the point B.

For to finde this foot of light at the Board above, we must from the point G draw a Parallel to the base as G I, and from the point B to make a Perpendicule to G I, which shall give the point K, which shall be the point of the foot of the light, as if the Torch were turned upside down.

For to finde it on the other side of the Hall, we must make the same Order as on the side C, and we shall have the point L.

For to finde the foot of the light at the bottom of the Hall, we must from the point H draw to the point of sight O, until that we divide the Perpendicule E at the point M ; then from this point M to make a Parallel to the base, which shall divide the Torch at the point N, this point shall be the foot of the light for the bottom of the Hall.

The foot of the Candle is found by the same Order, as that of the Torch, taking the midst of the foot of the Candlestick for the foot of the light ; but when it is a Plated Candlestick, or an Arm set against a wall, it must be that the Arm or the Branch of the Candlestick, determine the line, or shall be the foot of the light. For example, in the Plate P, we must by the branch Q draw a Perpendicular to the base, as R S; then from the fire T to make a small Parallel to the base, which shall divide R S at the point V, which shall be the foot of the light for this side, the point X shall be it for the board below, the point Y for the board above, and Z for the bottom of the Hall or Chamber.

For the Lamp, it is the place where it is fastned, which determineth its foot, as here *, from which place they draw a Parallel to the base unto the first Ray, and altogether the same as at the Torch, and at the Candle.

Ooiij
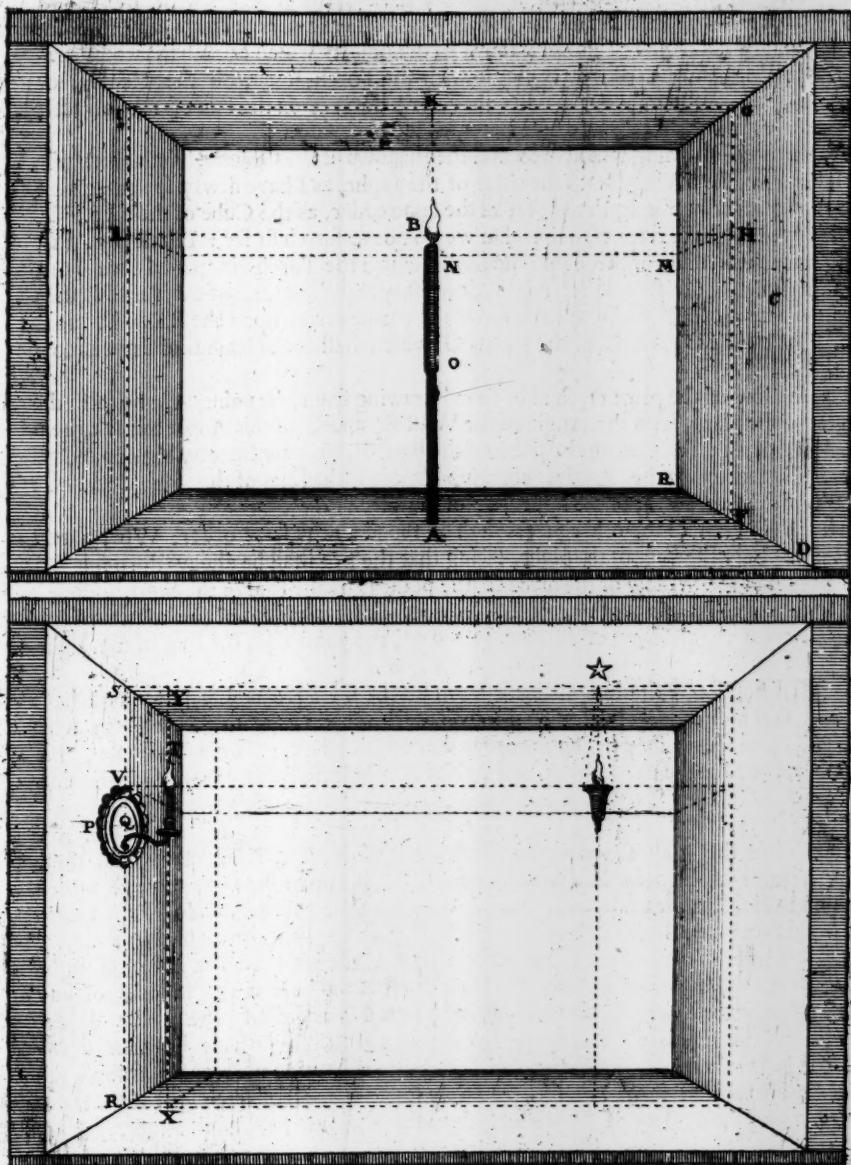
For to find the shadows by a Torch, on all the sides of a Chamber,

THe shadows taken from the Sun, draw always towards the Earth, by reason that this Star, communicateth not its brightness except it be above our Horizon: and by consequence elevated above all the objects, which causeth that their shadow always descendeth. But it is not so with the Torch, nor with the Candle, or with the Lamp, the which one may set above or below, or on the side of the objects, which rendreth their shadows on all parts, as we have said.

The Figure aforegoing will help to find the shadows of the Objects, set on every side of a Chamber, for having found the Foot of the Light, as I have newly spoken, there is no more difficulty, seeing that this is all the same order, as the Cube of the 141 FO, whither we may have recourse : but that we go not to search so far : I shall say , that for to have the shadow of the Table, upon the which the Torch is passed we must from the point A, the foot of the Torch, draw Rays by all the feet of the Table C, then from the point of the light B, draw lines by the corners from upon the Table I, until that they divide the Rays C, at the points O, which shall be the bounds of the shadow of the Table.

The shadow of the piece D, shall be found drawing from the point A, by all the Angles of the plane, unto the Angle of the Wall E, and from this Angle to raise them Perpendicularly : Then from the point of the light B, to draw lines by the top of this piece D, by observing the Angles correspondent to the lines of the plane, and we shall have the shadow F, of the figure, or of the piece D.

The shadows of all the other pieces shall be found by the same order: Wherefore I shall quote only the foot of the light, seeing that the fire shall be always the point B.

For to find the shadow of the piece G, the point L, is the foot of the light.

For to find the shadow of the piece N, the point H, is the foot of the light.

For to find the shadows of the pieces I and M, the point K, is the foot of the light.

The second Figure.

HAving found the foot of the light on all the sides of the Chamber as I have said in the foregoing leaf, one may have the shadows of the objects in what place soever they be, by the order that I have given. For by example , having found the foot of the light Q, and its fire P. We must for to have the shadow of the piece R, draw Rays from the point Q, which pass by the plane of the peice R, and to continue them infinitely, but because that they meet with the bottom of the Chamber, or the Wall T, we must at the meeting of the Angle S, elevate all these lines, Then from the point P, draw other lines, by the top of the same piece R, which shall go to divide those of the plane, and to mark the place of the shadow upon each of them, taking care that the Angles have reference to the lines drawn on the plane.

This order is so general, and universal, that he which shall well understand only how to take the shadow of a Cube, shall find no difficulty to find the shadow of any object whatsoever it be. Wherefore having given this order of the Cube at the 141 fol and this above which is altogether the same, I believe I have sufficiently instructed how to give all the shadows, without being obliged to use repetitions in all the other figures which follow, where I shall only quote the point for the foot of the light.

For to find the shadow of the piece V, the point X, is the foot of the light.

For to find the shadow of the piece Y, the point Z, is the foot of the light.

For to find the shadow of the piece R, the point &, is the foot of the light, and P, the fire or the light, for all the pieces of this second Figure.
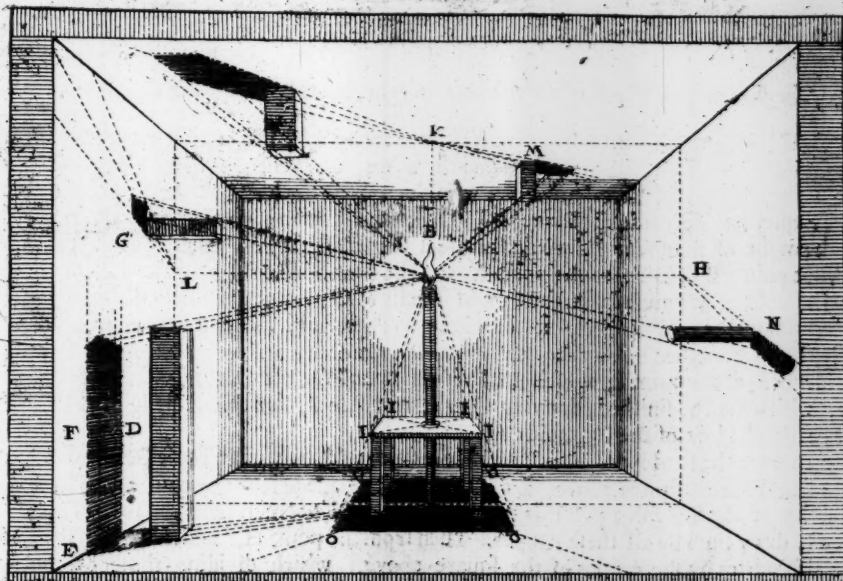
2 Figure
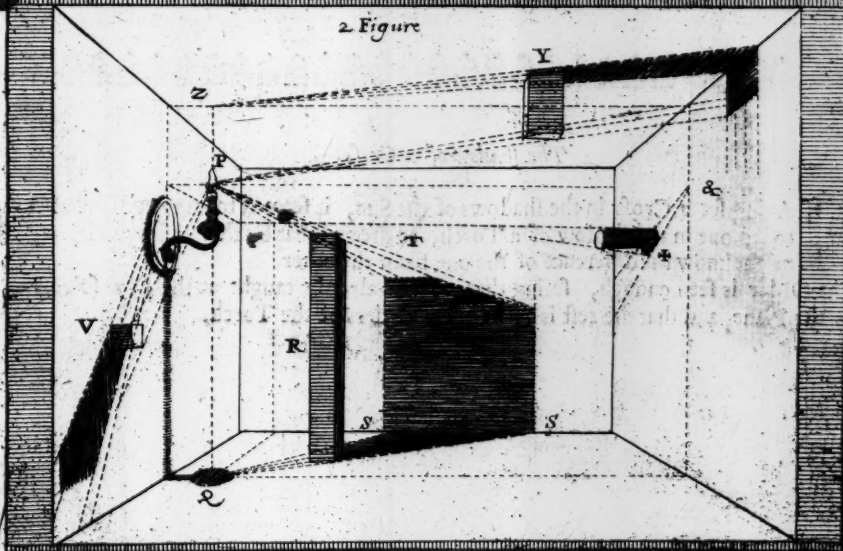
The shadow by a Torch of a Pyramide upright, and another upside down.

THIS Pyramide upright, giveth its shadow by a Torch, as if it were by the Sun, by reason that in the one and the other, there is but one line only, upon the which they determine a point, which is for the point of the Pyramide: For example, having made the Plane B C D E, and drawn two Diagonals for to finde the midst of the Plane F, we must raise a Perpendicule F A, then to draw from these four points B C D E, to the point A, and the Pyramide shall be framed; for to finde its shadow, we must from the foot of the light G, draw one line only passing by the point F, and prolong it infinitely. Then from the fire or light of the Torch H, draw another line by the top of the Pyramide A, and continue it until that it divide G F, at the point I, which shall be the bound for the shadow of the Pyramide, which shall be finished, drawing C to I, and E to I, for this Triangle C I E, shall be the shadow of the Pyramide A.

For to have the shadow of this Pyramide over-turn'd, we must cause Perpendiculars to fall from the square above, and to frame the Plane below thereby, as we have said at that of the Sun fol. 138. this Plane being framed, we must from the foot of the light G, draw lines by all these Angles, Then from the point H, which is the fire, draw also others by the Angles of the square above, which dividing those of the Plane, shall mark the place of the shadow as we have said in other Orders of the Torch.

The Shadow of a Cross.

HAving set a Cross in the shadows of the Sun, it seemed to me necessary also to set one in the shadow of a Torch, to the end that by that and by this, we might know the difference of the one from the other.

The Order is seen enough, seeing that we have already taught at the 137 fol. to finde the Plane, and that the rest is as in other Orders of the Torch.
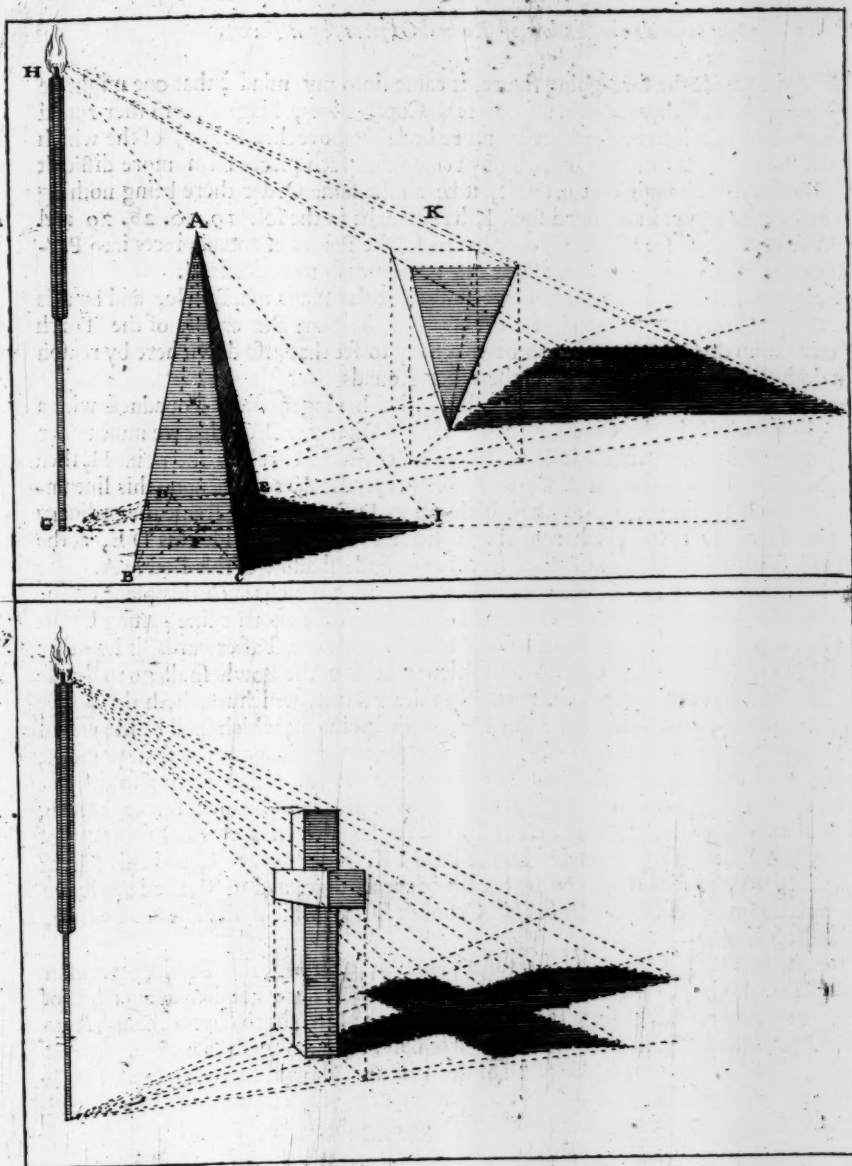
For to finde the shadow of Round Objects, by a Torch.

HAving made the fore-going figure, it came into my mind, that one might be in trouble, if there should be Bowles, Cups, Viols, Flagons, or other round pieces (which have Ordinarily more breadth above then below) of the which we would have the shadow by a Torch; by reason that such pieces seem more difficult then the squares, although that in effect, it be all the same Order there being nothing but to reduce the square into round so as I, have taught in the fol. 19. 20. 28. 29 and 86 : Where we shall see all the Orders for to set the Planes of round pieces into Perspective ; the which being known, all the rest is very easy to understand.

I have said already at fol. 138, how we must finde the Plane of a Bowle, and by this Plane, to have justly the greatness of the shadow by the Sun: But as this of the Torch is different from that ; I believed it to be necessary to set that also down here by reason that it doth facilitate the Order of all the other Rounds.

For the shadow of this Bowle, I say then, that having made its Roundness with a Compass, which is the the Circle A, and draw his Diameter B C, that we must under this Circle make a line Parallel to B C, which toucheth the Circle at the point H, then from the ends of the Diameter B C, to Cause Perpendiculars to fall upon this line underneath, as B D, and C E, of the which points D E, we shall frame the ordinary way the Plane D E F G, whereof the diameter F G, shall divide this D E, at the point H ; This Plane D E F G, shall serve for to finde shadow of this Bowle A. For after having drawn from the Foot of the Light I, lines which touch this plane on the one side and other, as are the lines I K and I L ; And also another line passing by the midst of the plane H, which shall be the line I H M. We must afterwards draw other lines from the Light of the Candle N, which touching the Bowle shall go to divide these lines of the Plane, as from the point N, to draw a line, which toucheth the Bowle between A and B, and divideth the line I H, at the point M, which shall be the end of the shadow : for to have the beginning of this shadow we must from the same point N, draw another line which toucheth the fore-part of the Bowle, and divideth also the line I H, at the point Q: this distance Q M, shall be the length of the shadow, for its bredth, we must also from the point N, draw two lines by the ends of the Diameter of the Bowle Z Z, and they shall divide the lines I K, at the point R, and this I L, at the point S. Wherfore if R S, be the bredth of the shadow, and Q M, the length, we have only to joyn these fower letters of Crooked lines, which shall give an Ovall, for the shadrw of the Bowle A

I have a little Extended my self for to facilitate the shadow of this Bowle, by reason that I beli ve this only Order sufficient for to finde the shadow of other Rounds, as of the Figure V, the which having two breadths unequall, ought to have a Plane of two Circles. And that below X, which hath three differences, obligeth to make a Plane of three Circles ; The one for the Neck of the Viol, or Flagon, the other for its Belly and the other for the foot : all these Planes are made as of the Bowle. I believe that it not necessary to use Repetitions. The figure being able to teach of it self.

... resting by the Foot of the light C, unto the end of the Table L, ...

... Memory of that, which I have ... in the ... figure, ... that Shadows diversly, and accord- ... to the light, serve for that which is upon the Table, ... the ...

... ... in Figure O, the ... ... Observe also ... Clock ...
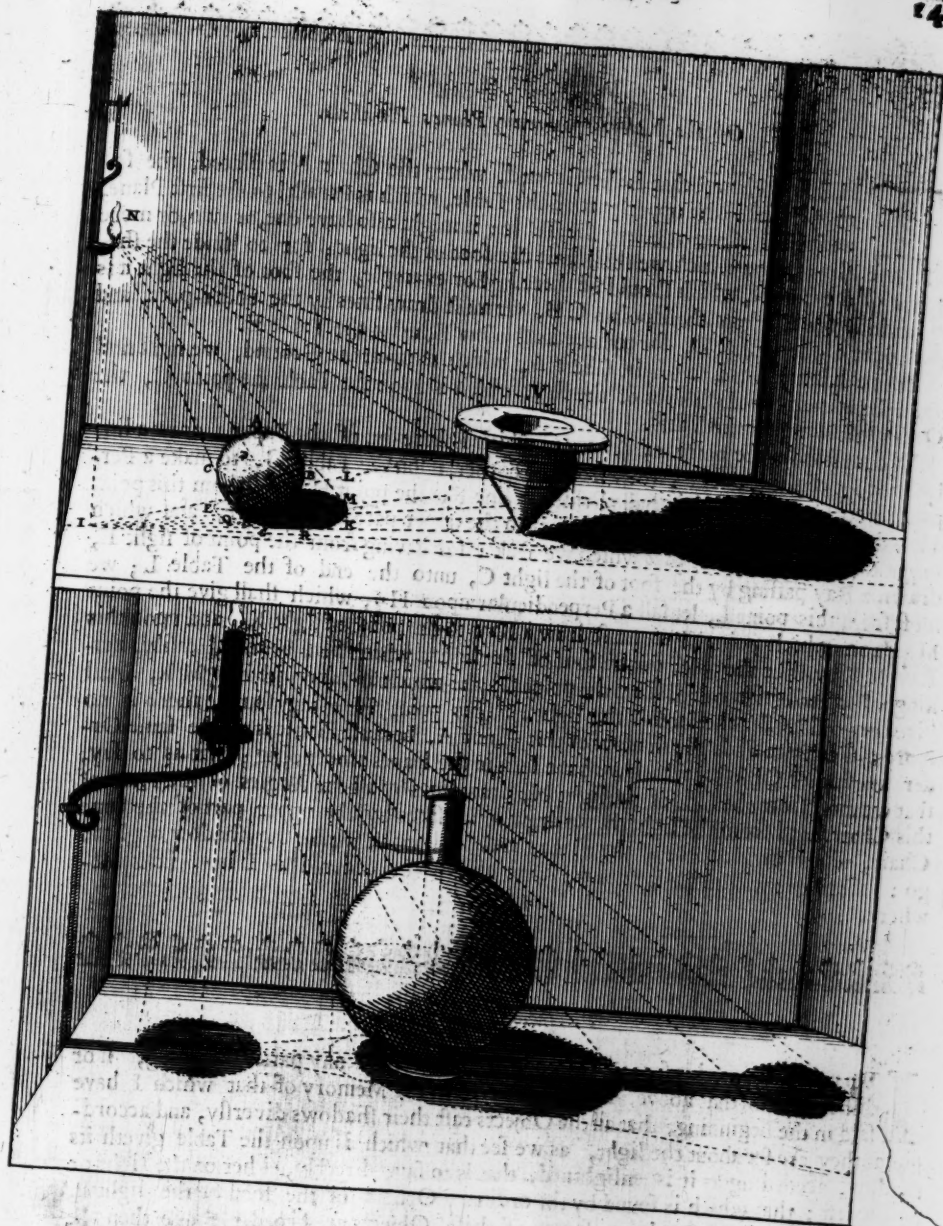
Of the shadow upon many Planes-Parallels.

THE first Plane, that is the Ground, where the Chair A is placed, the second Plane is the upper part of the Table, which is Parallel to the first Plane, and either above or below the Table : it might also have one, or two, or more of these Planes, upon which we shall finde the foot of the light ; for to finde the shadows of the Object, which should be there. For example, the foot of the light it is C, and the fire B ; from these points C B, we must draw lines by the under-part, and the upper of the Object D, for to have its shadow E, upon the Table E.

But to have the shadow of the Chair A, which is upon the Ground, we must find upon the same ground the foot of the light which is upon the Table the point C, the Order following teacheth this.

We must from the point of distance, which is here out of the Paper, draw a line by the foot of the Table F ; then from the corner upon the Table G, to make a Perpendicular G to fall, which shall divide the line F at the point H, and from this point H to draw a Parallel H I, which is equal to the upper part of the Table, and which ought to facilitate to finde that which we seek : for having from the point of sight K, drawn a Ray passing by the foot of the light C, unto the end of the Table L ; we must from this point L, let fall a Perpendicular upon H I, which shall give the point M ; from which point M we must draw a Ray to the point of sight K ; and upon this Ray M K must be the point of the foot of the light, which shall be found easily, making a Perpendicular to fall from the point C, the which dividing the Ray M K, shall give the point N for the foot of the light. This point N being found, there is no more difficulty to finde the shadow of this Chair A, because that it is all the same Order as of other Objects, which we have seen in the leaves aforegoing ; that is to say, that we must from the foot of the light N, draw lines by all the Angles of the Plane of this Chair, and from the light B, to draw other lines by the upper part of the same Chair, which divide those of the Plane, and shall mark where the shadow ought to go : the figure will make it known, that all is to be ordered as I have said elsewhere.

The second Figure.

I Do not set down this second Figure, for that I have any particular thing, nor different from that above. But only to refresh the Memory of that which I have said in the beginning, that all the Objects cast their shadows diversly, and according as they are set about the light, as we see that which is upon the Table giveth its shadow, according as it is enlightned, that is to say, directly, either on the right or on the left : that which is found by the ordinary Orders of the foot of the light P, and of its fire or light O, the most part of these Objects are broader above then below, wherefore we must make their Planes, as I have said in those folio's where I have spoken of the like figures.
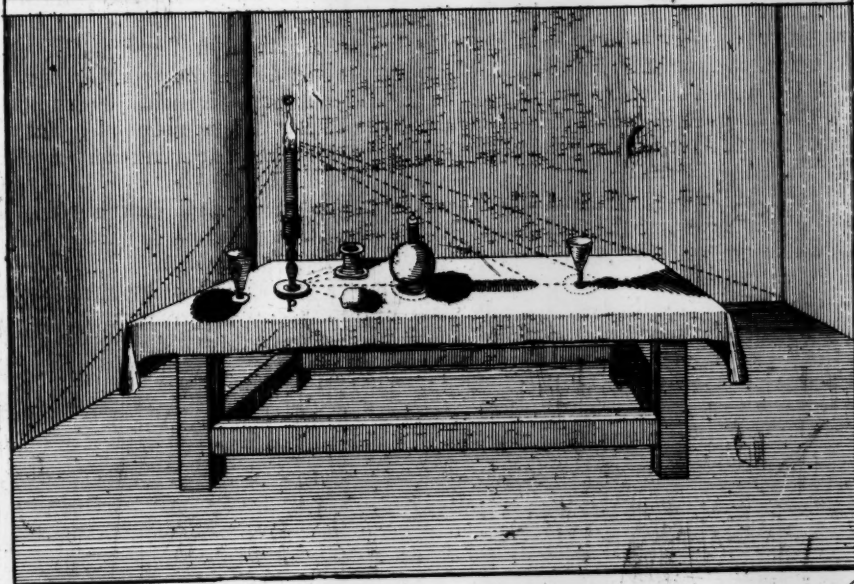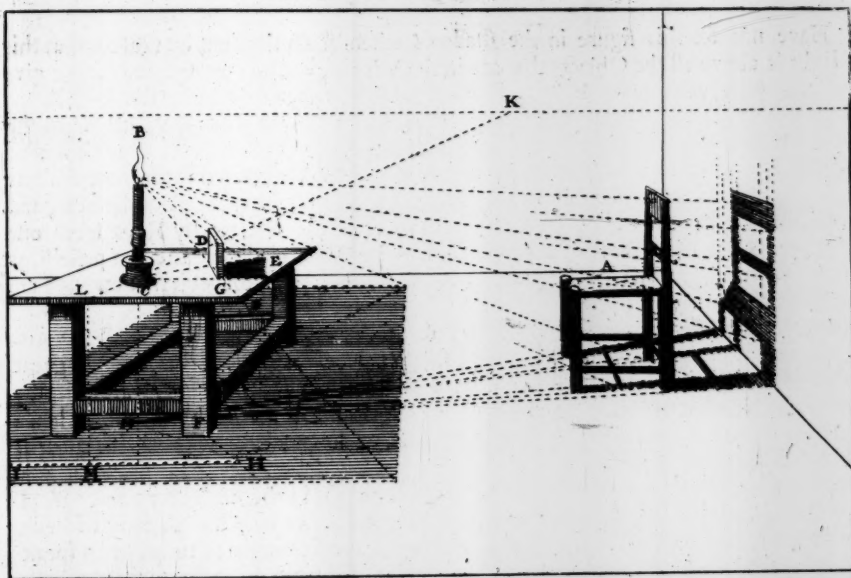
The shadow of boarded Floores by a Torch.

I Have not set this figure in the shadows taken from the Sun, by reason that this light is above all the Objects that are in the World, and by consequence cannot give a shadow, which supposeth the Light, or the Light-some-body under the Object.

One might object to me that Experience causeth it to be seen every day, that when the Rays of the Sun enter within an Hall, or a Chamber : the shadow of the Floores and of other things cease not to appear ; To which I answer, that then this shadow, or these shadows, is not, or are not of the Sun, but caused by the great Brightness of the Sun ; and such shadows might not be given by Parallels, as those of the Sun, but by Rays from one and the same Center ; as those of a Torch, taking the Window where the Sun passeth, or the place where it giveth, for the point of the light, and to do for such shadow, as I am saying of the shadow of a Torch.

The Orders aforegoing which oblige to make Planes and to draw lines by all the Angles, for to finde the bound of the shadows, would be too long for this, and the great Number of lines, which one must draw there, would make this figure very difficult, by reason of the Number of Beames and Joysts which there are met with : the which made me seek the Means to abridge it, for to make is easie in the practise, without going forth of Rules and Maximes of Art.

Having made the floore in Perspective, as it is taught in the 55th or 57 fol. And placed the Candle, the Torch, or the Lampe, in what place we would. We must search by the means of the foot of the light, the place where the fire ought to to be, or to speak more truly, the which we shall use in stead of the fire, for from this point to lines, which pass under the Object, and mark out the bound of the shadows.

For to have this point of fire, the light being at B, we must from the foot of the light C, draw a Parallel to the Base D E, untill that it cut the Ray E F, at the point G, from this point G, we must elevate a Perpendicule G L. Then from the fire of the Torch B, draw a Parallel to D E, which shall divide the Perpendicular G L, at the point L, and this point L, shall serve for the point of fire, which shall give the place and the length of the shadow.

For Example, having to finde the shadow of the Beame A, we must from the point L, make a line to pass under the Angle which is towards us as H, and see where this line L H, shall divide the first Joyst, at the point I, for this shall be the place where the shadow of the Beame endeth : from this point I, we must draw a parallel I K, and marke upon the Joysts the place of the shadow O, for the shadow of the space of the Joysts, ir will be found by drawing also a line from the point L, by the Angle of the first Joyst M, which shall divide the Angle of the Hollow at the point N, from this point N, making a Parallel N P, we shall have all the shadow marked Q, for the Beame A.

For to finde the shadow of Joysts, besides that of the Beame, we must only draw a line of fire B, by the Angle S, untill that it divide the Bottome of the Floore at the point T, do the same to all the other Joysts, and you shall finde the shadow longer at the farther distance from the fire. Having marked upon one Beame all the points T, we must from the point of sight R, draw lines by each of these points, and we shall have justly between all the other Beams, the shadow of the Joysts as is to be seen at the points V.

The figure below is the same with that above, with this difference, that this is shadowed and that the former is not, by reason that the shadow would have hindred to see the letters and the small lines. There is more in this, the shadow of the Jawmbs of this Gate, which must be taken from the foot of the light as is to be seen in X and Y.
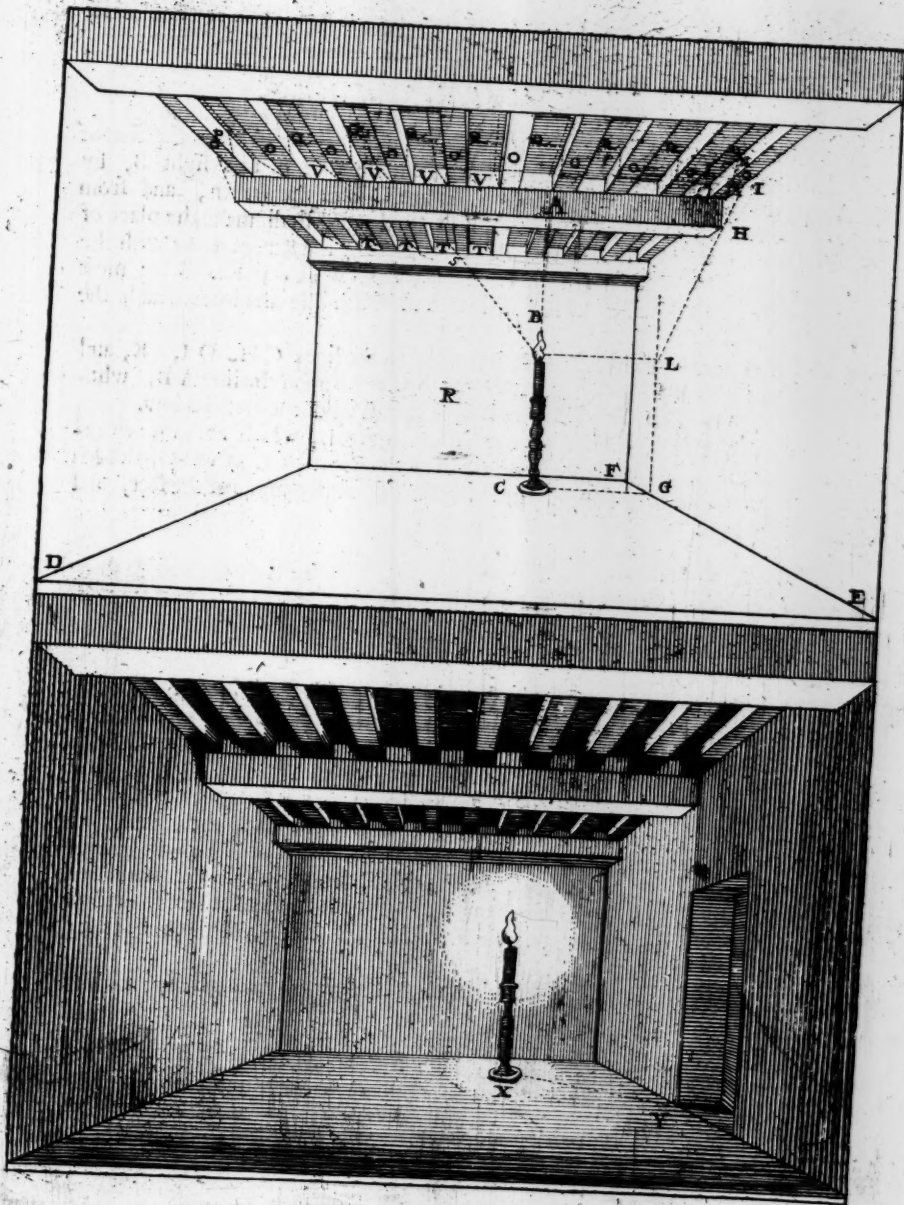
For to finde the shadow by the foot of the light.

IF the Objects be Perpendiculars to the base, and more elevated then the fire of the Candle A. We ought only to draw lines from the foot of this light B, by the Angles most advanced of the Objects, as are C D of the Screen, and from the Angle of the wall E, the which lines B C, B D, and B E, shall make the place of the shadow at the meeting of the Angles, which the Shuts of the Screen make with the floor, and also the return of the wall at the points G, from which points G we must elevate Perpendiculars at the base G R, which shall finish the shadows which the Candlestick A giveth

The reason of this is, that the line A B, is parallel to the lines C H, D I, K, and E L, the which maketh that, in what part soever the fire be upon the line A B, whether on high, or in the midst, or all below, it shall give always the like shadow.

We must observe, that this Order is not good but in Pieces, which are more elevated then the fire, as these here ; for when those shew the upper part, as the Object M, we must use the Orders aforegoing, by drawing lines from the points of the feet, and of the fire of the light

Of the Shadow doubled.

WHEN two lights meet in the same subject or object, it is of necessity that two shadows meet there, because that each day or each light produceth its own with proportion, I say, with proportion ; for if these Fires lights be equal, at the same distance : It is certain that the shadows shall be equal ; but if there be the least disproportion, as if the one of these lights be a little greater then the other, or that these fires be a little greater then the other, or that these fires, although equal, be more or less advanced the one then tho other from the object ; these shadows shall be different ; for example, the object O, being enlightned with two Candles ; the one near P, the other farther off Q ; it is most assured, that the shadow of the Candle P, shall be much stronger then that of the Candle Q, as is to be seen in the figure.

The Orders of these shadows, are no other, then those that I have given, as well for the Sun as the Torch
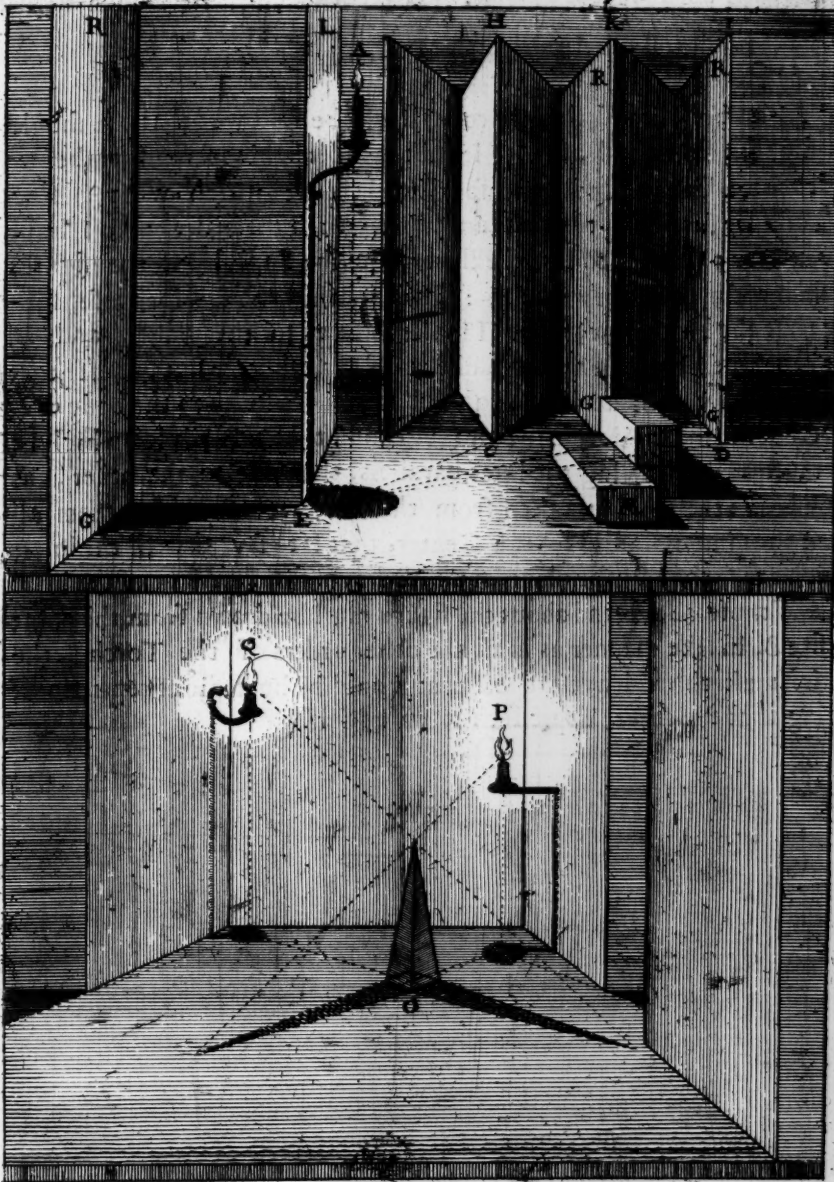
For the Shadow of Figures by a Torch.

IT is to be believed, that my counsel will be followed that one should not turn over the leaf for to learn the order which followeth, before they understand and remember well, that which went before Wherefore supposing that one understands well the order, that I have given at 139 fol. for to find the shadow by the Sun, for all the figures of such postures as they may be : I have nothing to say for these, seeing that the line below, which I make to serve for the plane, and all the other measures are taken in one, as in the other. But because that the Torch doth not render an equal shadow in breadth to the body that giveth its shape, as doth the Sun : We must take this advice, which is, that instead of drawing the llnes parallels, that one to the other, as they are in the shadows taken from the Sun, we must draw them all from the same point, as from a Center; that is to say, that all the lines, which are drawn by the plane, must be drawn from the foot of the light A, and those above, and about the figure must be drawn from the point of fire B, in like manner as in all the other orders of the Torch, the which maketh me leave the rest, that would be but tedious repetitions, seeing that the figure expresseth it of its self.
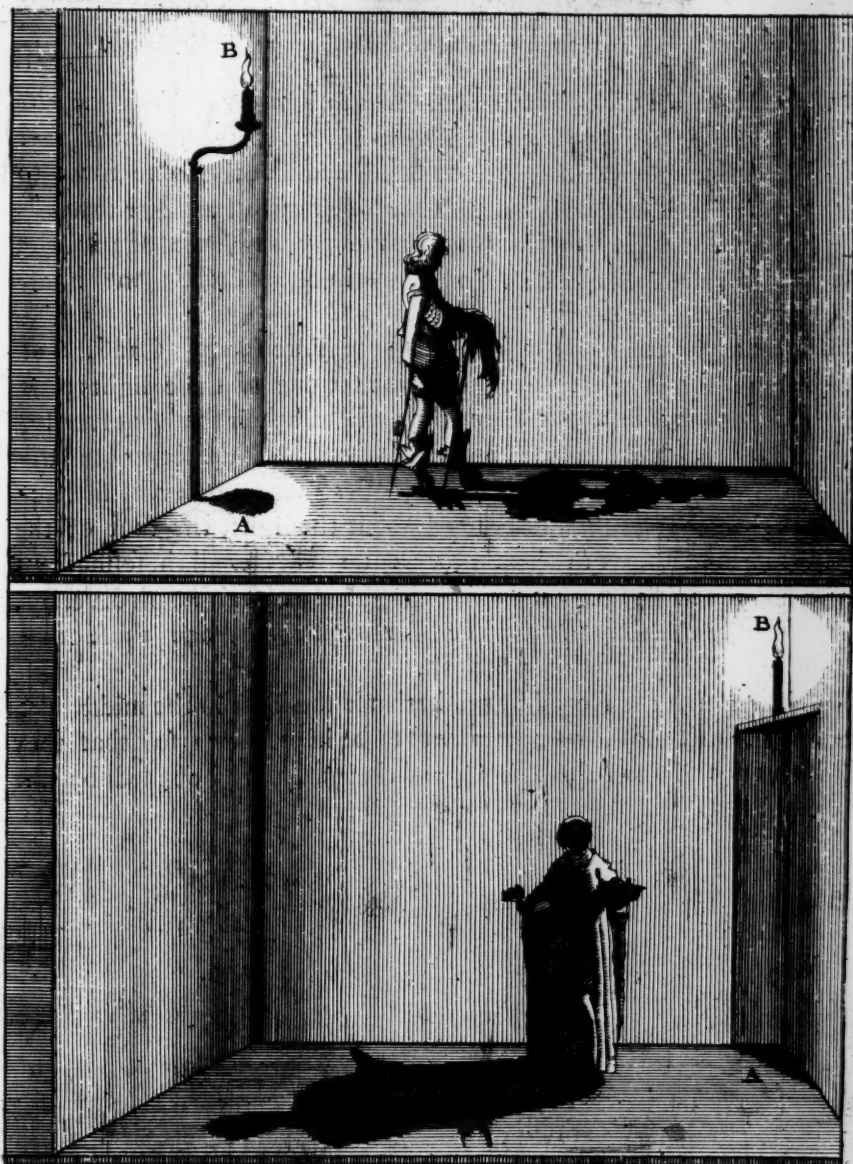
Of the divers dispositions and heights of shadows by the Torch.

THe shadows taken by the Sun, do cast themselves always on the same side, and have ordinarily one and the same disposition : it being impossible that the Sun should cause at the same time, to cast the shadow of one body towards the West, and of another towards the East, it is very true that it doth this every day, the one in the morning, and the other in the evening, but in one and the same hour, it will never do it naturally.

The which is done without failing, by the Torch, the Candle, or the Lamp : for in what place soever you set one of these lights, if there be many bodies about them, they will cast their shadow diversly, that is to say, that the one will cast it to the East, the other to the West, this to the North, that to the South : in short on every side according as the bodies shall be ordered about the light, the foot of the which marked A, serveth them for a Center, whether all these shadows draw, and the fire B, marketh where they must end, although diversly, by reason that the nearest, have their shadow shortest, and those that are farther off, cast it more at length,

Although that the second figure hath not the light in the midst, yet the order of these shadows ceaseth not to be kept, as we see that they all draw to the foot of the light C, and that they are bounded by the point of fire D.

THE TABLE.

round

A

F I N I S.

A CATALOGUE of Books Printed for Rob. Prick, *and are to be sold at his Shop over against the* Cross-Keys *in* White-Cross-street, *and the* Golden Lyon, *at the Corner of* New-Cheapside *near* Bethlehem,

A New Treatise of *Architecture,* according to *Vitruvius.* Wherein is discoursed of the five Orders of Columns, *viz.* The *Tuscan, Dorick, Ionick, Corinthian* and *Composite.* Divided into seven Chapters Which declare their different Proportions, Measures and proper Names, according to the Practice of the ancient *Architects,* both *Greeks* and *Romans* ; As also of their parts general and particular, necessary in building of Temples, Churches, Palaces, Castles, Fortresses, and all other Buildings with their Dependents *:* As Gates, Arches Triumphant, Fountains, Sepulchres, Chimneys, Cross-barr'd windows, Portals, Platforms, and other Ornaments ; serving as well for the beautifying of Buildings in Cities, as for necessary fortifications of them : designed by *Julian Mauclerc* Lord of *Lignoron Mauclerc Brossand ere* and *Remanguis.* Whereunto are added the several Measures and Proportions of the famous Architects, *Schamozzi, Palladio,* and *Vignola* : with some Rules of Perspective. The whole represented in fifty large Prints, enriched with the rarest Ornaments of Antiquity, and Capitals of extraordinary greatness, with their Architraves, Frieses, and Cornishes proportionable. Large fol. price bound 12 s.

A New Book of Architecture, wherein is represented fourty figures of Gates and Arches triumphant Composed of different Inventions, according to the five Orders of Columns, *viz* The *Tuscan, Dorick, Ionick, Corinthian* and *Composite,* by *Alexander Francine* Florentine, Engineer in Ordinary to the *French* King : With a Description of each figure Large fol bound 10 s.

The Art of *Fair Building* : Represented in several Uprights of Houses, with their Ground-plots, fitting for persons of several Qualities Wherein is divided each Room and Office according to their most convenient occasion, with their Heights, Depths, Lengths and Bredths according to Proportion: VVith Rules and Directions for the placing of Doors, VVindows, Chimneys, Beds, Stairs and other conveniencies : with their just Measures for their best advantage, both of Commodiousness, Health, Strength and Ornament Also a Description of the Names and Proportions of the Members belonging to the framing of the Timber-work, with Directions and Examples for the placing of them By *Pierre le Muet,* Architect in Ordinary to the *French* King, and Surveyor of his Designes and Fortifications in the Province of *Picardy* Large fol. price bound 8 s.

A Book of Architect, containing Cieling-Pieces, Chimney-pieces, Fountains, and several sorts useful for Carpenters, Joyners, Carvers, Painters, invented by J *Barbet.*

Gethings Redivivus or the *Pens Master-piece.* Being the last work of that eminent and accomplished Master in this Art. Containing Examples of all curious Hands written, and now in Practice in *England,* and the Neighboring Nations : with necessary Rules and Directions towards the attaining of Fair writing, &c.

An Excellent Introduction to Architecture, being a Book of *Geometrical Practice* VVhich is the first degree of all Arts : wherein is contained Variety of Examples of
that

that admirable Science, shewing and describing the making of several Figures in that Nature, with the proper Names belonging to each Member and Figure, and how to begin and end them after a plain and easie manner, it being of great use to all Artists and VVorkmen concerned in Building: More especially, *Surveyers, Architects, Engineers, Masons, Carpenters, Joyners, Bricklayers, Plaisterers, Painters, Carvers, Glasiers, &c* In general, for all that are concerned or delight to practise with the Rule and Compass. 4to price bound 2 s.

Magnum in Parvo, Or the Practice of Geometry. VVith a new Order and particular Method thereof: VVherein is contained Examples of *Landskips,* Pieces of *Perspective,* and the like: Represented by Eighty two Plates: Each Plate having a full Descrptiion. Bound with fillets 4 s.

Likewise there is Choice of Copy-books, Maps, Landskips, Cieling-Pieces, Books of Birds, Beasts, Flowers and Fruits, coloured, or black and white. Also very good Choice of *Italian, French* and *Dutch* Prints; there likewise you may have mony for such like Books or Prints in *English, Italian, French,* and *Dutch,* or others in Exchange for them.

F I N I S.